the OIL AND GAS JOURNAL
PUBLISHED WEEKLY JANUARY 25, 1960

What's involved in the "conspiracy" trial ▸ 117

Gas turbines promise big pipeline savings ▸ 120

Two new methods for offshore completions ▸ 122

Review-Forecast SECTION

Yesterday recorded
Tomorrow predicted
to help in
Today's planning

p.141

It's portable, It's corrosion-resistant

It's the ROCKWELL "1600"

ALUMINUM GAS METER

for measuring field gas at up to 100 psi working pressure

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OIL AND GAS JOURNAL
Vol. 58 No. 4

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Annual index available on request.

Review-Forecast Section

As Oil Enters the Challenging '60's 141

The comprehensive report in this issue on every phase of the oil industry is here distilled into a few concise pages for thoughtful planning for the coming year, balanced against present trends and considerations ranging from finding new oil to selling what's already produced.

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the OIL AND GAS JOURNAL Newsletter

Tulsa, Okla.
Jan. 25, 1960

Oil should make some real progress in 1960:

Statistical adjustments made in 1959 prepared the way. The outlook generally is for improvement in all segments except drilling—provided excess capacity is contained.

Predictions from Journal's annual Review-Forecast:

...Total demand will rise 4.6% to 10,103,000 bbl. daily. Domestic demand will go up 4.8% to 9,872,000 bbl. daily and imports will set new record of 1,808,000 bbl. daily.

...Drilling will see 50,771 wells—10,569 wildcats and 40,202 field wells. This is a fraction under 1959's operations, which were up 3.6% over the year before.

...Refinery runs will hit 8,293,000 bbl. daily, a gain of 3.8%, but will still leave the industry with overcapacity. Look for more now records in liquid-gas production.

...Pipeline construction may experience one of the top years. The gas industry is still growing but the rate of gain is slowing down.

...Exploration may be in store for unprecedented records both in this country as well as abroad (The Journal's Review-Forecast special section begins on p. 141).*

▼ ▼ ▼

Pipe and tubular mills expect first-half operations to hit about 90% of capacity, steel sources report.

Demand for standard pipe is strong. Makers of oil-country goods are pushing for quick delivery, especially of tubing. Line pipe has good future prospects but timing of new pipeline projects often is not set.

Makers of tubular goods face some long-range headaches. U. S. mills are losing out on foreign line-pipe jobs. Exports of oil-country seamless have been hit by foreign competition. Buttweld pipe also faces a serious import threat.

▼ ▼ ▼

Domestic rig activity has sagged to 1,617 rigs working last week.

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*Refers to article in this issue giving more details. Where no page is given, the item is a Newsletter exclusive.

The total is unusually low and a few weeks early for the normal drilling low point of the year.

Low point in rig activity last year was the week of February 2 when 1,781 were active. In 1958, the low was in week of March 17 with 1,694 active.

Company plans indicate about the same number of wells are planned this year as last. This may mean operators are waiting to gage industry conditions before launching their drilling programs. Look for a really good last half in drilling if this proves true.

▼ ▼ ▼

Price shifts: Sohio has cut 10 cents a barrel off its postings in Bayou Bouillon, La., field. New top is $3.20... Conoco cut dealer tankwagon prices on all grades of gasoline in New Mexico by amounts ranging from eight-tenths to nine-tenths of a cent per gallon...Group 3 suppliers cut one-fourth cent from distillates.

▼ ▼ ▼

Oil's tax plight may have more public sympathy than most oil men believe.

Preliminary results of an API-sponsored public opinion survey indicate that two-thirds to three-fourths of the public opposes more taxes for highways and that 70% indicate willingness to sign a petition against higher gasoline tax.

Oil men find little to cheer about in the President's budget proposals. Proposals which would affect oil either directly or indirectly: Increase in tax on gasoline, avgas, and jet fuel; continuation of 52% corporate tax rate; higher fees on non-competitive federal oil leases; increase in the postal rates; failure to drop levies on telephone calls and passenger rail travel (p. 128).

A quick look around the political beat:

Government's antitrust case at Tulsa apparently will be based heavily on circumstantial evidence and inference to establish a conspiracy to fix prices (p. 117).

...Antoine Pinay, latest French political casualty, may have accomplished one important victory on his way out. He may have scuttled the plan to form a government-controlled oil marketing monopoly in France (p. 137).

▼ ▼ ▼

Imports from Canada will be watched closely this year by U. S. officials. They are inclined to be critical of the Borden report's estimates of the volume of Canadian oil the U. S. can absorb.

Canadians have been told privately that the exemption from quotas was voluntary, unilateral, without any strings. But it can be withdrawn at any time if volume and prices have

an adverse effect on the U. S. oil industry.

U. S. position: Canadian crude can take a big portion of increase in U. S. demand without causing a ruckus, but attempts to force the market will bring trouble.

One American gripe is Canada's effort to increase exports of both oil and natural gas to U. S. at same time. The gas sales automatically reduce market potential for oil.

Regulation of unfinished oil imports into District 5 probably will remain unchanged.

Changes proposed by the Oil Imports Administration to permit unfinished oil imports of up to 25% of crude-oil allocations instead of 10% have met with so much opposition on the West Coast they will probably be shelved.

Chief arguments: Gasoline stocks on West Coast have been building up rapidly recently. Imports of unfinished oils have been falling far short of permissible 10% level indicating higher quotas not needed.

Residual imports during the last half of 1959 fell just short of the total allowable. Interior says the 6-month total hit 66,804,009 bbl., for Districts 1-4. This is 69,503 bbl. under the total quota for the 6 months.

Nonbonded stocks of residual on the East and Gulf Coast were 25,906,850 bbl. at the end of December, more than 4 million barrels below the same time last year. However, bonded stocks of resid at year's end were well over the same time in 1958—9,114,928 bbl. compared with 3,497,000 bbl. in December 1958.

▼ ▼ ▼

New instrument may help oil explorers. Primarily airborne, the tool will measure gravity gradients to define ore bodies that have a density contrast.

For oil exploration, this will help geophysicists interpret base rocks and domes which might be oil bearing. It also is applicable for ships in offshore exploration.

Need is imperative for more gravity control in many areas of the world for fuller evaluation of prospects.

Drilling notes: West Coast firm now can make either underwater or abovewater completions offshore from the same floating drilling vessel that drilled the wells (p. 122)... Winter's second wildcat north of Arctic Circle in Northwest Territories has been spudded. It's Western Decalta 1 Rond Lake, 40 miles north of Circle which will seek Devonian reef...Iowa may now have its first commercial producer (p. 135)...A hydraulic percussion jar that operates swiftly and continuously to loosen stuck drill pipe is being tested (p. 127)...And for the producer, Dowell has a new technique to prevent paraffin from accumulating in a well. Pipe, after being specially cleaned, is given a chemical coating (p. 136).

Jersey Standard is shifting ownership of International Petroleum Co. from one pocket to another.

Hope is a few more shares will turn up in new package.

Esso Standard of Canada is offering to buy International stock at $45, a price near the 1959 high. International has operations in Peru and Colombia and owns 25% of Mene Grande's big Venezuelan operations.

Jersey Standard owns 96% of International and has made previous efforts to buy up the 472,000 shares held by minority stockholders.

Look for two other majors to launch sweeping reorganizations in 1960.

New York financial sources report the firms have submitted to management consultant surveys. Recommendations in both instances are said to parallel those made to Jersey Standard and Socony.

Object is to tighten up operations sharply to gain efficiency made imperative by increasingly tough competition.

▼ ▼ ▼

New high-speed, lightweight gas-turbine centrifugal compressor now being tested by Trunkline Gas may mean:

...Greater use of gas turbines as drivers of centrifugal compressors on long gas lines.

...Reduced capital cost of installed horsepower making low-cost boosters the most economical way to pipeline expansion (p. 120).

An end grinding machine offers solution to an old problem of pipelining: How to get smooth surfaces on pipe ends in the field.

The machine grinds a 30° bevel and smoothes the end for a flat-face aligning. Workmen can complete a pipe end in 15 to 30 seconds (p. 131).

Phillips Petroleum has rejected a certificate to sell gas to United Gas Pipe Line at a price which FPC cut 2 cents below the contract level.

FPC conditioned the sale to an initial price of 15 cents. Phillips declined, saying it had an intrastate customer at 17 cents an M.c.f. Involved is 33 billion cubic feet in North Henderson field, East Texas.

It's heresy but some oil-transportation executives expect electric cars to make their debut in motor fleets in the next 10 years.

The electrics—powered by batteries—may find a use as "in-town" cars where speed is not essential and rough treatment rare.

Vehicles powered by combustion engines using petroleum fuels would be reserved for highway or field duties.

Good Wells Make Good News

A Report on Wells That Have Been Improved with Abrasijet

January 25, 1960

Abrasijet* is a new Dowell-developed service that uses high-velocity streams of fluid and abrasive particles, usually sand. The abrasive fluid is jetted against the casing or the hole wall, and has been extremely successful at both perforating and formation cleaning. Here are some results from wells where Abrasijet has been used.

- **Mesa County, Colorado** (Old Gas Well) This well was drilled in 1955 but had been plugged and abandoned. It was cleaned out and pipe was set. Abrasijet was used to perforate into the Morrison sand at a single level — 4073 feet. 6000 gallons of fluid carrying 6000 pounds of sand were jetted. Next, the well was fractured; it then potentialled 2400 mcfd. Other wells in the field usually potential around 500 mcfd.

- **Harper County, Kansas** (New Oil Well) An attempt was made to complete this well with conventional perforating through 4½-inch casing. Formation was the Mississippi Chat at about 4464 feet. After perforating, acid could not be pumped into the formation at 3200 psi. Then Abrasijet was used to perforate, and zone was treated with Mud Acid at 3.7 bpm and 1550 psi. After clean-up, well started flowing 12 bopd without fracturing.

- **Wise County, North Texas** (New Oil Well) This well was to be completed into the conglomerate. Abrasijet was selected to perforate at 5707 feet. Well was fractured down the annulus on the same well set-up. Treating pressures were lower than on offset wells. One month later production had stabilized at 135 bopd on a 13/64-inch choke. This production was 20 to 30 bopd better than from similar wells in the area. In addition, the operator saved over $600 in completion costs.

- **Alberta, Canada** (New Oil Well) Casing was set for this open hole completion at 8680 feet in an 8785 foot hole. The Mississippian was logged between 8705 and 8735 feet. Log indicated only three feet of "good" pay between 8717 and 8720 feet. Abrasijet was used to clean the hole wall. 25 barrels of acid (without sand) were jetted. The formation was then squeezed with 3000 gallons Dowell inhibited acid with a silicate control agent added. After clean-up, the well tested 220 bopd — operator felt this an excellent well, considering the thin pay zone.

Use Abrasijet for better completions, or better workovers of problem wells. For service or detailed information, contact the Dowell office or station nearest you. There are more than 150 locations in the United States, Canada, Venezuela and Argentina. Dowell, Tulsa 1, Oklahoma.

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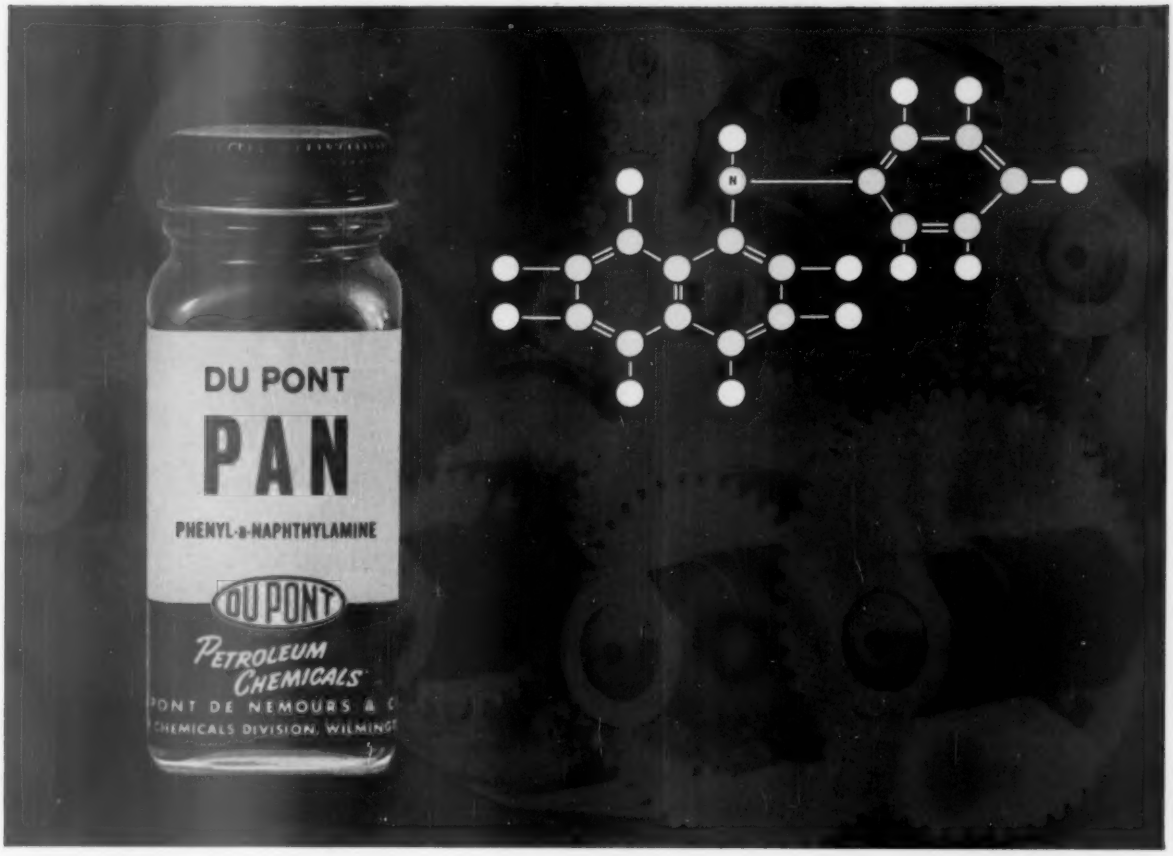

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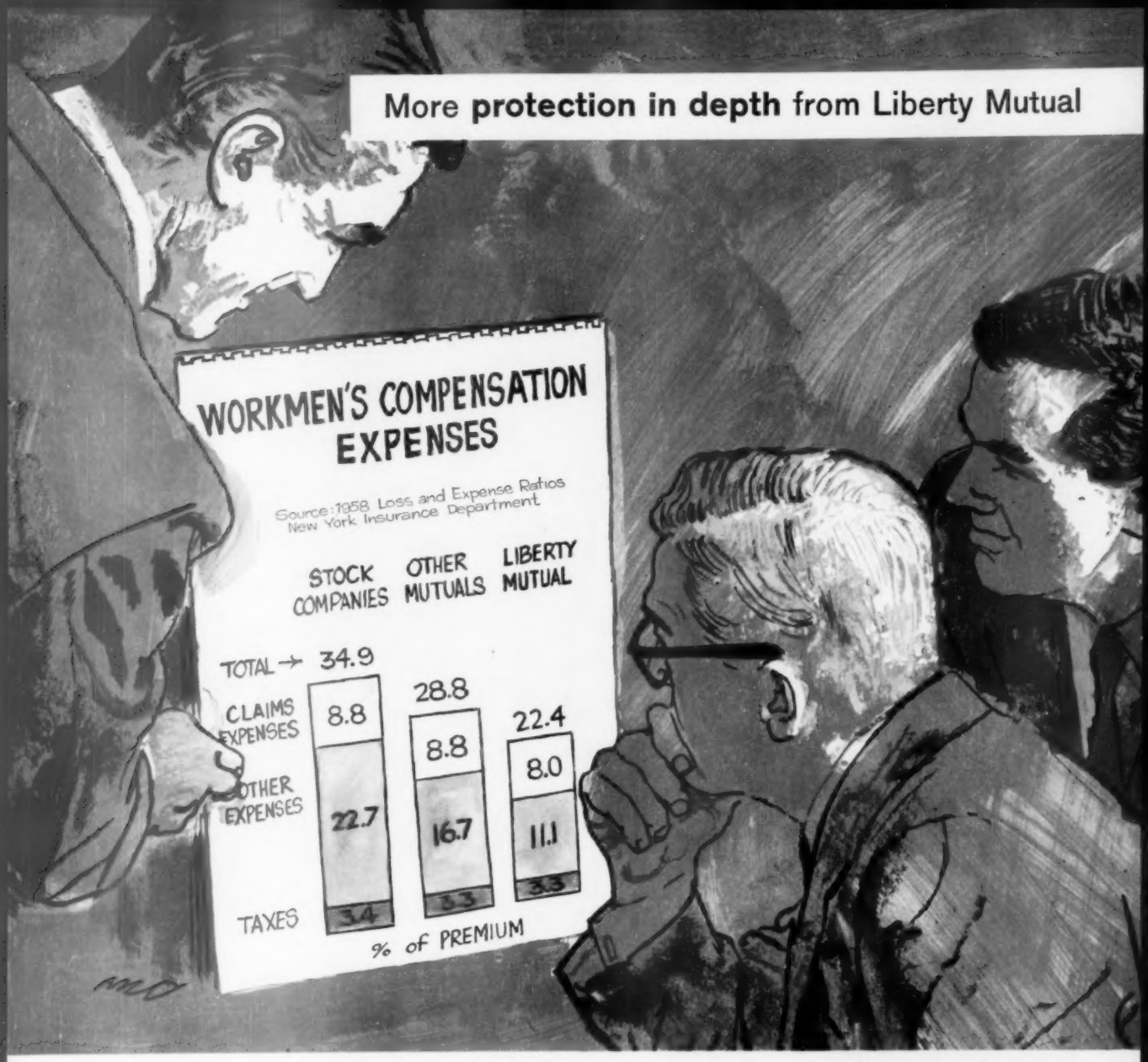

Why your insurance costs go down when Liberty Mutual handles your workmen's compensation

The price you pay for workmen's compensation insurance hinges directly on the cost of accidents and losses and your insurance company's cost of doing business.

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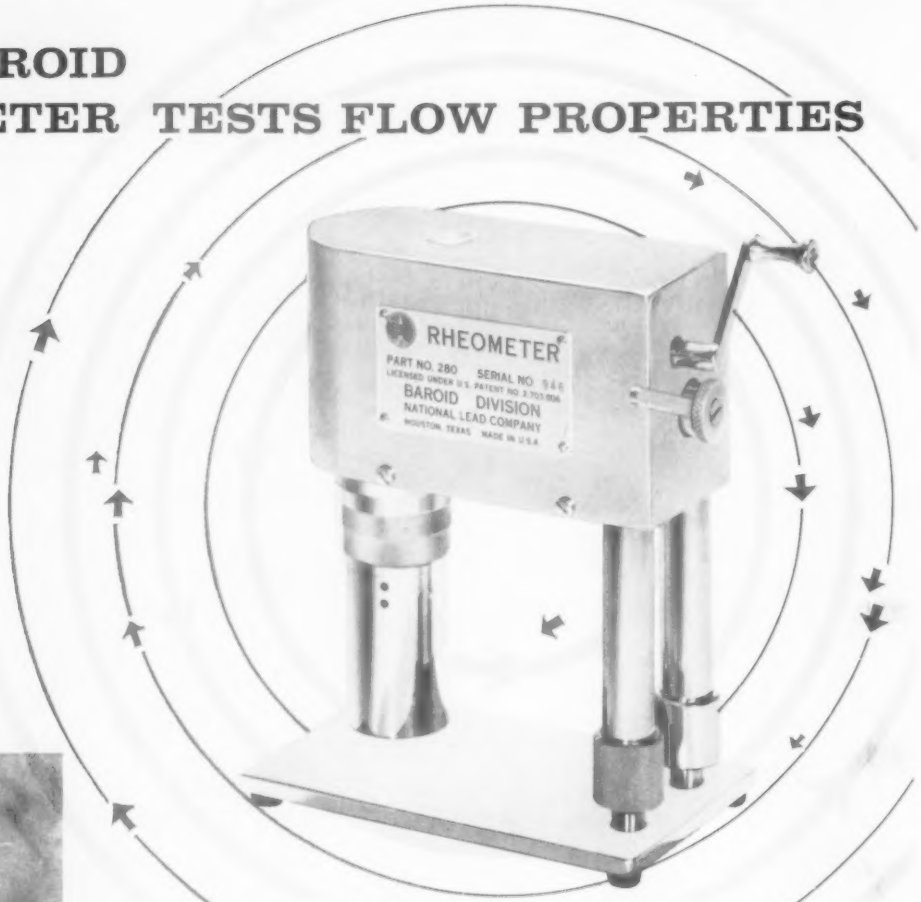
NEW BAROID RHEOMETER TESTS FLOW PROPERTIES



The new BAROID RHEOMETER is a rotational viscometer to field-test the flow properties of drilling fluids. The BAROID RHEOMETER operates at two rotational shear rates. Readings are used to determine the *plastic viscosity* and *yield point* of drilling fluids.

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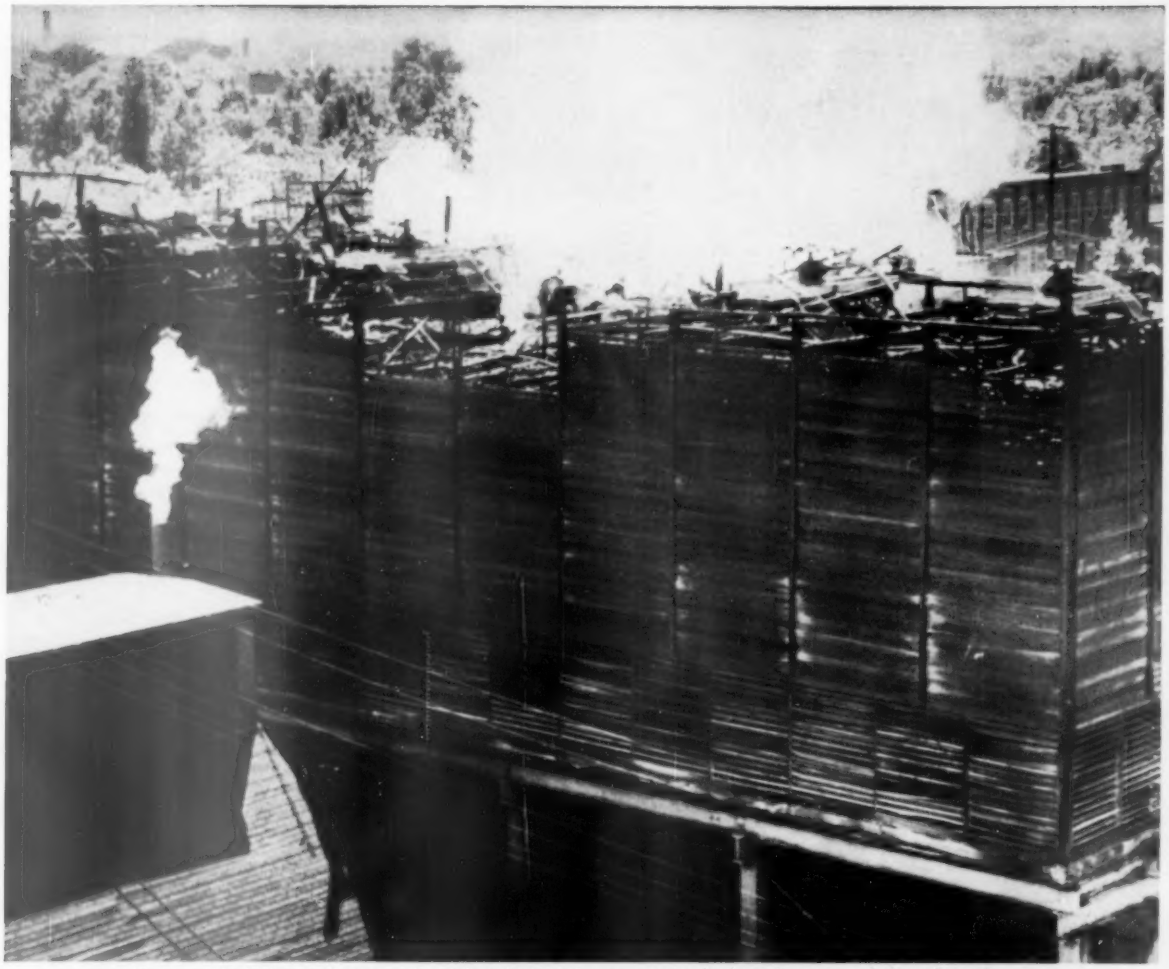

Fire caused by friction spark destroyed top 6 feet of this cooling tower, severely damaging motors, shafts and gear boxes.

Protect your water cooling tower from crippling fire with a Grinnell System!

Water cooling towers are essential in many industries today. But cooling towers can, and do, *burn*! Furthermore, fire may strike when the tower not only is shut down, *but even while it is in use*. One insurance company has stated that nearly half its losses involving towers occurred when the towers were in operation!

Why are cooling towers so vulnerable to fire? Because they are largely made of wood. It is true that when the tower is operating most of the wood is wet. But roof and sides can become excessively dry through exposure to the sun. Also, there is a portion of the tower above the cooling water distribution system that is never wet.

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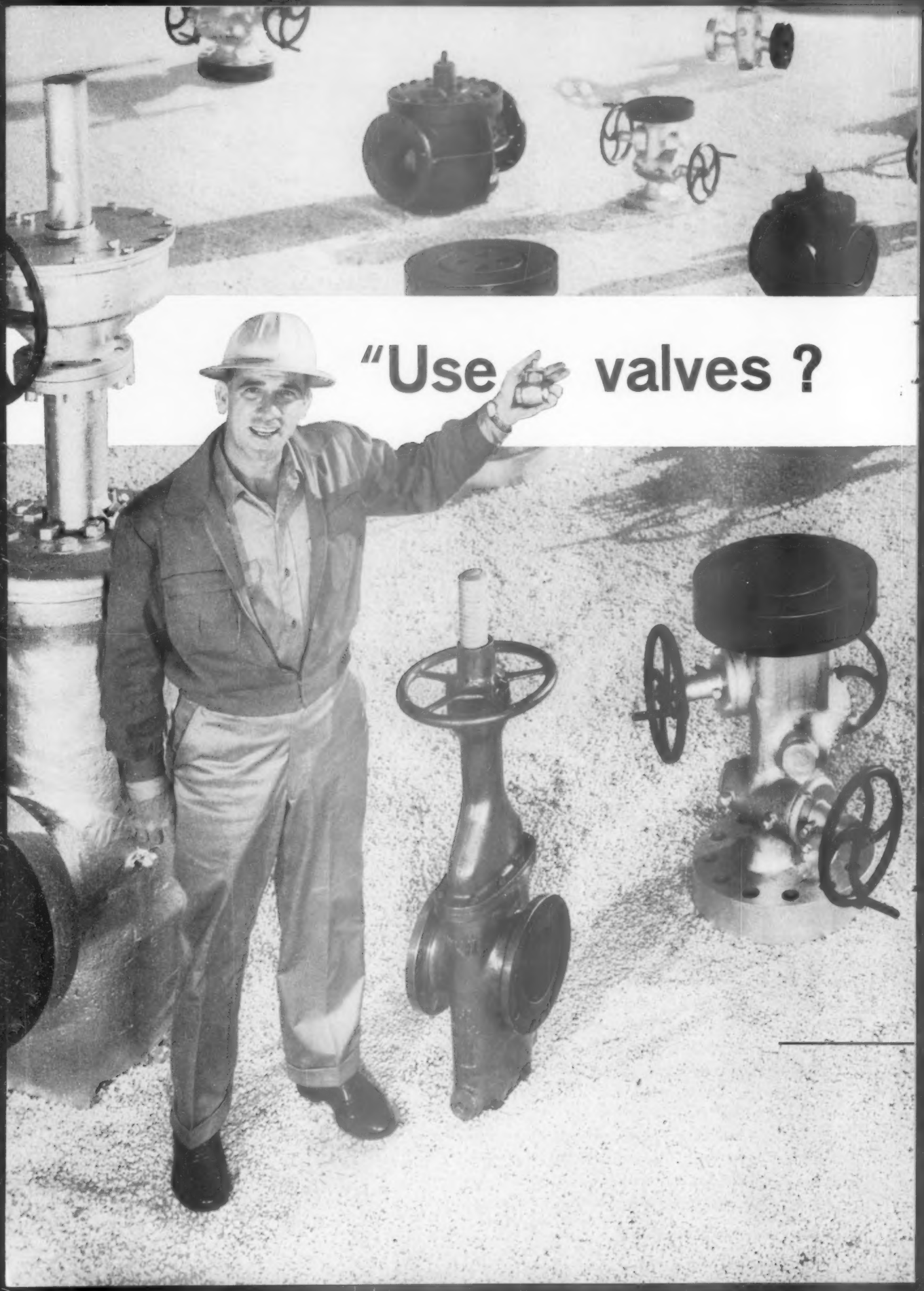
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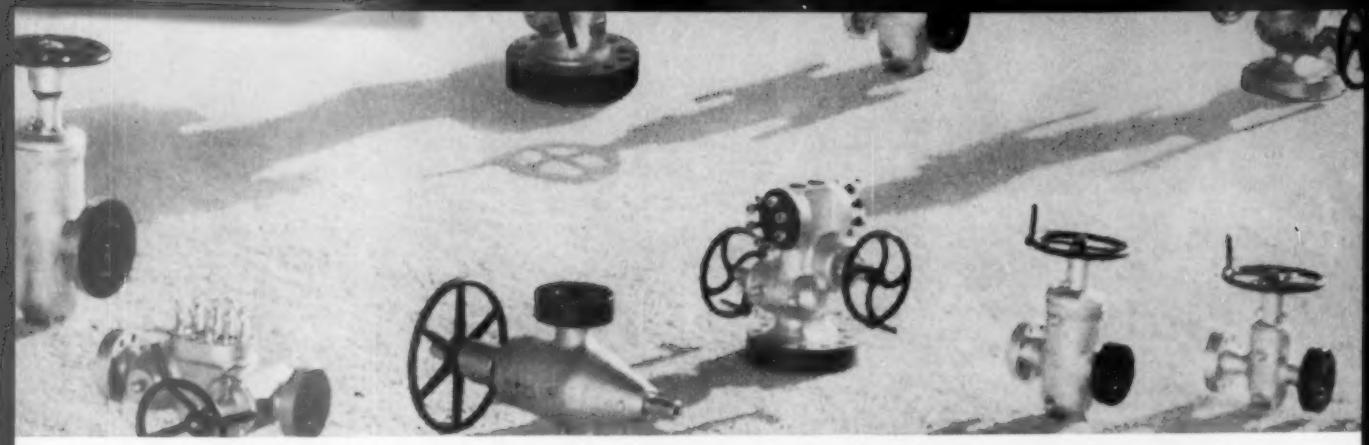
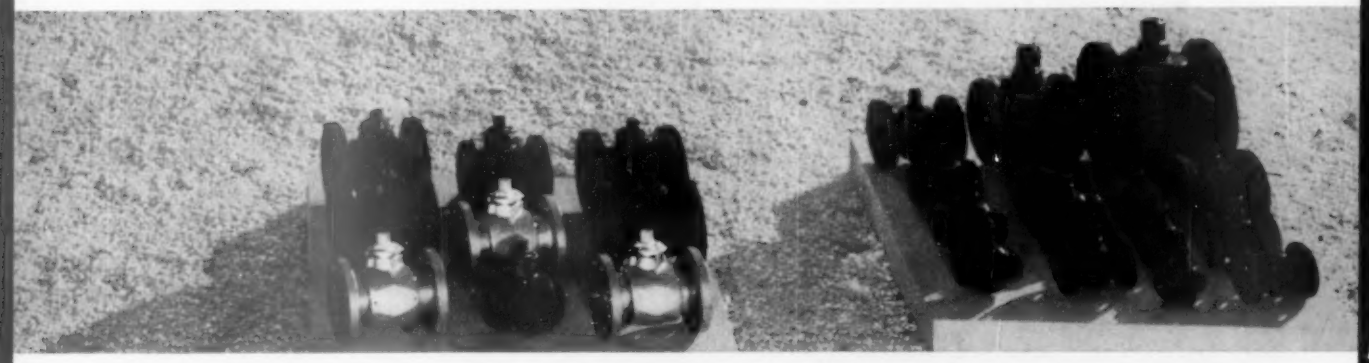


Use the best !"



W-K-M and ACF Valves for the Petroleum Industry

Whatever your requirement, there's an industry-proved W-K-M or ACF valve that will handle the job superbly — and with long-range economy.

Since 1932, W-K-M Oilfield Valves by the tens of thousands have harnessed the complete range of wellhead pressures — up to 13,100 psi, the world's highest. ACF Plug and Ball Valves have been industry leaders in gathering and storage systems, oil refining and gas processing. And today there are more W-K-M Pipeline Valves in mainline service than any other valve.

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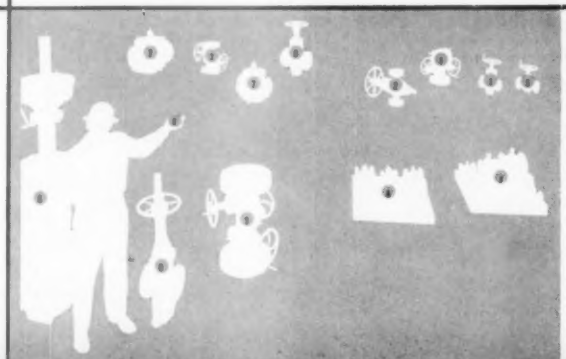

For complete information on valves by W-K-M, write for the following catalogs:

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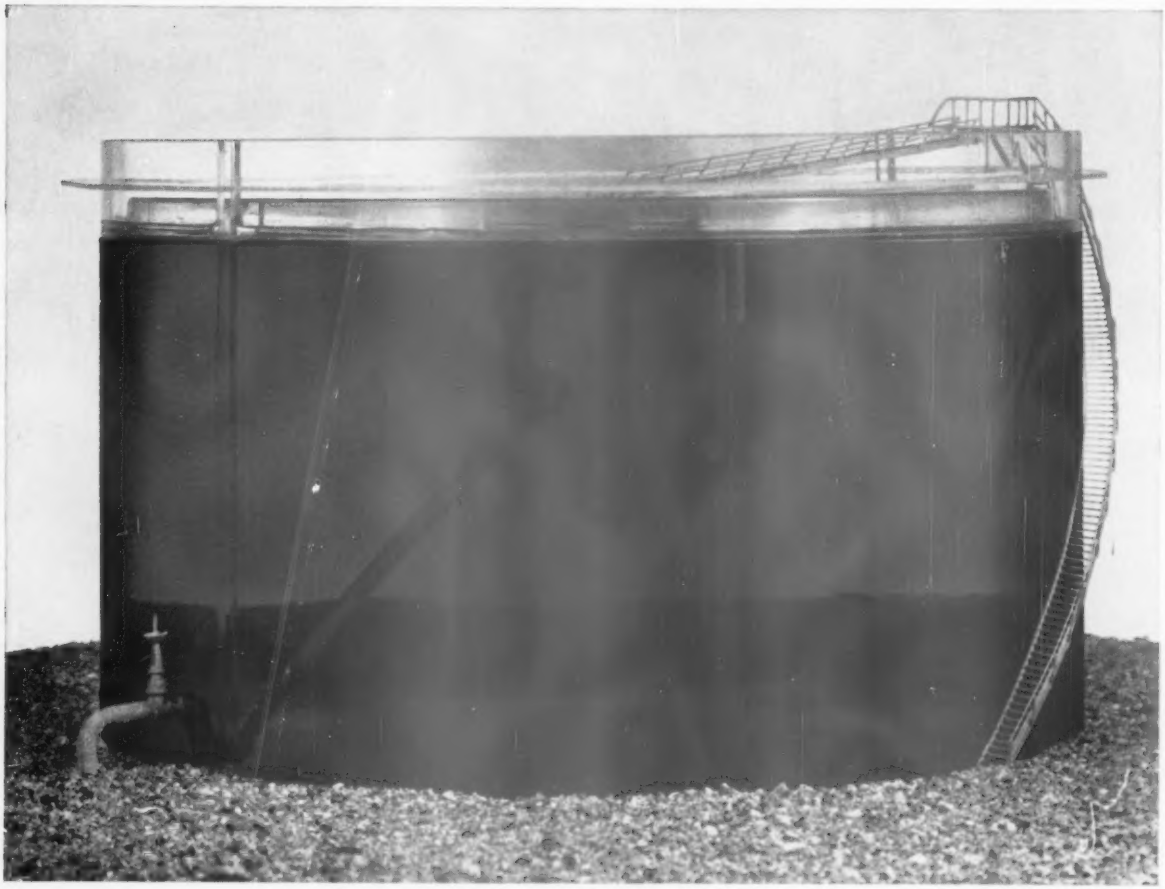
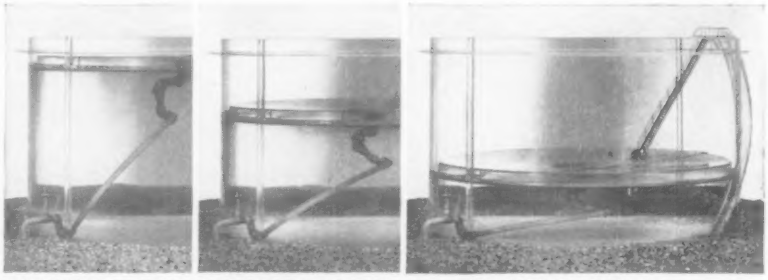
ON FLOATING ROOFS–



Chiksan Swivel Jointed Drain Lines team up strength + flexibility + endurance

The unlimited flexibility of Chiksan swivel joint equipped floating roof drains mean money saved on every tank. First, Chiksan drains cost less than rubber hose —and, you count their useful life in years instead of months. Chiksan swivel joints and lines easily withstand tank pressures —never kink to cause drain stoppage. Both lines and joints are available in many types of metals to meet specific liquid storage requirements.

Plan now to include Chiksan drain lines in all new tank installations and in present lines that need replacement. For details, contact Chiksan or your nearby Chiksan field representative.



FULL TANK. Drain line flexes readily. Easily withstands tank pressures.

TWO THIRDS FULL. All metal line moves freely with the floating roof without danger of kinking.

TWO THIRDS EMPTY. Line folds compactly. Provides long years of trouble-free service.

CHIKSAN fmc

A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

#60-49

CHIKSAN COMPANY—Brea, California • Chicago 5, Ill. • Newark 2, N. J. • Divisions: Chiksan International, Hamer Valves, Weco • Subsidiary: Chiksan of Canada Ltd.

IVERSON SUPPLY COMPANY EXPANDS

IN OKLAHOMA CITY AREA WITH NEW SALES OFFICE

OKLAHOMA CITY OFFICE
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CEntral 2-7852

STORES:

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Oklahoma City,
Okmulgee.

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Artesia,
Farmington.

TEXAS —
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Cortez.

The Iverson Supply Company is proud to announce the opening of a new sales office in Oklahoma City, to serve the oil industry in that area.

The new Oklahoma City office is ready to provide you with immediate, efficient service on all of your petroleum equipment requirements. The Iverson Supply Company is known for the quality of equipment handled, with every item backed by a confident guarantee of satisfaction.

In Oklahoma City, as in all major oil producing areas . . . CHECK WITH IVERSON, *whatever your requirements!*

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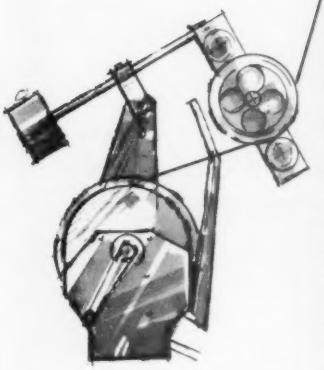
POWER LINE TO PROFIT



Halliburton Power-Driven Measuring Equipment Means More Accurate Downhole Determination!

The Halliburton Measuring Device, first developed over 35 years ago, provided the Industry with a means to accurately measure the top of the cementing plug being pumped to the bottom of a string of casing. This assured a placement of cement slurry outside the casing and around the shoe joint.

Today, Halliburton offers a complete line of Power-Driven Measuring Assemblies . . . still pointing the way to increased efficiency on your job and more profit in your well operation.

Popular applications of this advanced Halliburton equipment are:

- Accurate measurements of depths in wells.
- Running crooked hole survey instruments.
- Running instruments to obtain bottom hole pressures and temperatures, fluid samples, etc.
- Running mechanically operated paraffin cutting tools.
- Running Halliburton Limit Plugs, or other types of tools in casing or in open hole.
- Running shifting tools through tubing in changing chokes and seating nipples.

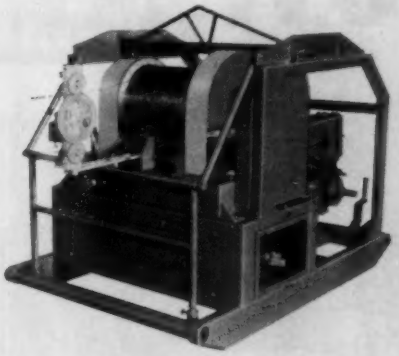
HALLIBURTON
MEASURING EQUIPMENT

"A Measure of Accuracy - - - for All Downhole Requirements"

PICK YOUR POWER...

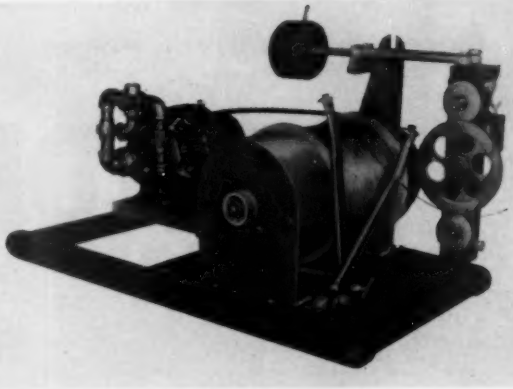
DIESEL

This diesel-engine-driven Super Duty Measuring Assembly is designed for the toughest and most severe types of wire line operations. It is a completely packaged unit including power, three-speed transmission, reel assembly, controls, measuring device and wire line. The convenient center-lift point and rigid guard rails are ideal features for work on offshore platforms or for heavy duty wire line service anywhere. The line capacity of reel ranges from 3000′ of 5/16″ cable to 43,600′ of .082″ diam. steel wire line.



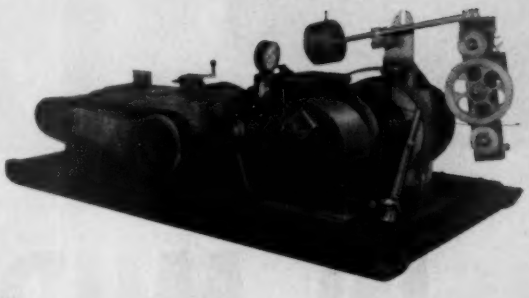
AIR

With the increasing use of pneumatic controls and drives for drilling equipment, many operators are finding it convenient to drive their Halliburton Measuring Line Equipment with air motors . . . especially where safety practices rule out diesel or electric power. Most Halliburton Standard Measuring Reels are suitable for mounting and driving with this radial 5 cylinder air motor. The line capacity of the Heavy Duty Reel ordinarily preferred ranges from 10,000′ of .092″ to 18,000′ of .066″ diam. steel wire line.



ELECTRIC

This Extra Heavy Duty Type Electric Measuring Assembly is designed for use where dependable electric AC power is available. The compact unit is equipped with a three-speed transmission, a 5 hp variable-speed electric motor, Extra Heavy Duty Reel, measuring device and measuring line. The motor controls are conveniently located and all wiring is installed in accordance with the latest codes and specifications. The line capacity of this assembly depends upon type of reel selected which may range from 3000′ of cable to 67,500′ of .066″ diam. steel wire line.



Replacement Parts . . . are available in most Halliburton warehouses for Standard Measuring Devices, Reel Assemblies and Accessory Equipment. Measuring Lines of standard diameters and types are stocked everywhere Halliburton Cementing Trucks are stationed.

HALLIBURTON MEASURING EQUIPMENT

HALLIBURTON OIL WELL CEMENTING COMPANY • DUNCAN, OKLAHOMA

284 SERVICE CENTERS . . . JUST MINUTES AWAY FROM YOUR WELL

NOW AT LAST THERE

More Milwhite Stock Points

More New Products from Milwhite

IS A DIFFERENCE

More Milwhite Research

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More Drilling Benefits
When you Specify
Milwhite Mud Service

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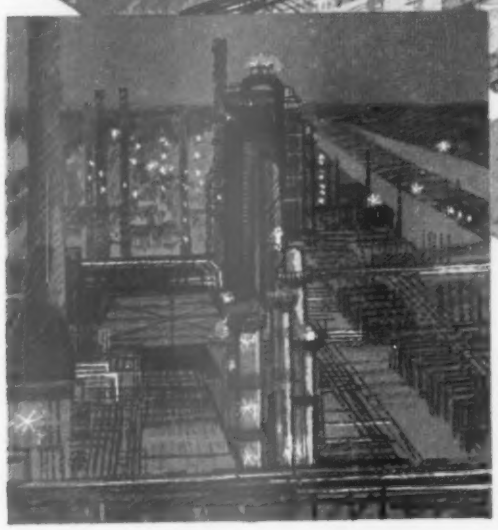
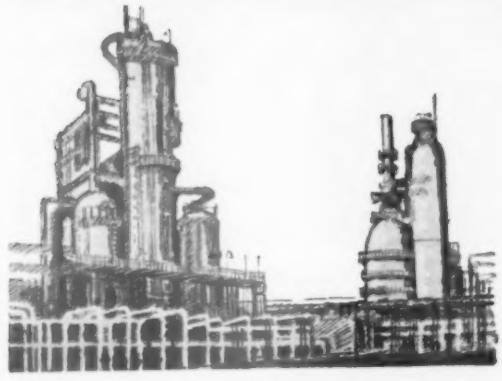
A DIVISION OF MISSISSIPPI RIVER FUEL CORPORATION

Who we serve proves *how* we serve





Since 1923, the world's leading petroleum refineries, chemical plants and other process installations have operated with the aid of Pacific centrifugal pumps. Their satisfaction with the cost-cutting efficiency provided by Pacific pumps is apparent in continuing repeat orders for plant expansion and new facilities.

There are several advantageous reasons for these re-orders; among them: (1) Pacific is a specialist in the development, design and manufacture of centrifugal pumps. (2) Pacific manufactures a wide variety of types and sizes to fill specific needs at the most beneficial cost/efficiency level. (3) Pacific provides technical advice and counsel to customers through an experienced sales engineering staff. (4) Pacific pumps may be financed in the leading currencies of the world.

There are other reasons why Pacific can serve you best. We would welcome an opportunity to tell you about them.

PACIFIC

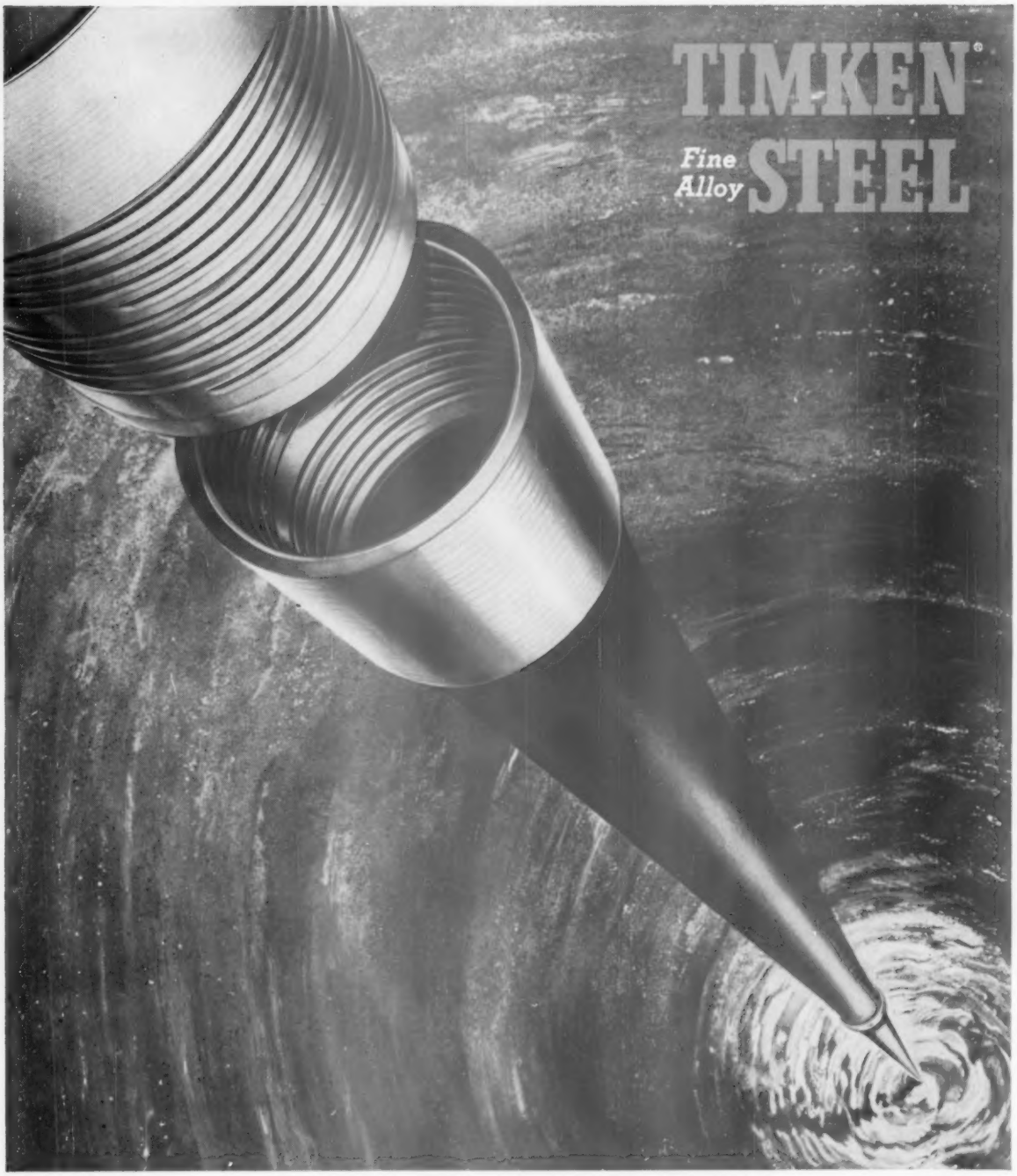
Offices in all Principal Cities

PACIFIC PUMPS

Inc. . . A Division of Dresser Industries, Inc.

HUNTINGTON PARK, CALIFORNIA

IN-3



125,000 PSI! That's the yield strength of this Timken® seamless steel tubing. Stronger by 20% than the stiffest API requirement, 5A. Strong enough to handle the deepest wells being drilled. This oil well tubing takes internal pressures up to 15,000 psi, gives excellent ductility and uniformity. Our metallurgists, with 25 years' experience in pressure problems, can help you solve yours. FREE BOOKLET. For your copy of the fact-packed "Timken Oil and Gas Well Tubing," write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.

FISCHER & PORTER

INSTRUMENTS THAT MEASURE AND CONTROL TEMPERATURE, PRESSURE, FLOW, &c., &c., &c.
have established and maintained their reputation for superiority against all competitors through the years and are in increasing demand. As in the past, it is the unalterable
DETERMINATION OF THE HOUSE TO SEND OUT NOTHING BUT WHAT IS OF
THE HIGHEST POSSIBLE QUALITY

THE HANDIEST GUIDE TO THE VARIOUS AND SUNDRY METHODS PRESENTLY AVAILABLE FOR MEASURING FLOW

It has been our pleasure and profit over the years to aid and assist divers engineers in the estimable task of selecting the one—nay, the *only* device best suited to measuring a given flow. But truly, the years have added, the devices have multiplied, and the task of selection has grown ever more complex. As a result, the "handy" guides, so reminiscent of an earlier day have grown less handy all the time. Let us see how handy we can be.

LESSON I

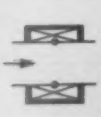
There are but four major types of flowmeters.

1. VARIABLE-AREA (ROTAMETERS)

2. VARIABLE HEAD (ORIFICES, VENTURIS & CO.)

3. INTEGRATING (TURBINE)

4. OBSTRUCTIONLESS (MAGNETIC)



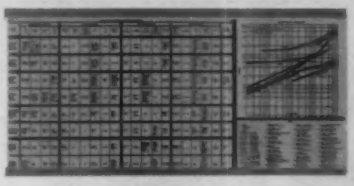
LESSON II

In order to be as handy as possible, we shall limit our discussion of the advantages of the four basic types to a single characteristic benefit.

1. Variable-Area: linear scale
2. Variable Head: flexibility
3. Integrating: accuracy
4. Obstructionless: obstructionless

LESSON III

The lesson to be learned may well be that there is a definite limit to just how "handy" one can be . . . and still serve as a guide. Six pages hold the record at present. We call the guide Bulletin 91-119, but others have called it the first practical map ever published to the land of flowmetering.



LESSON IV

There are those who philosophically oppose all "handy" guides. If you are among that group, we can only state that we make them all . . . every one of the four major types. A call to our technical assistance group will bring you a firm recommendation unencumbered by bias or prejudice.

THE JUSTLY CELEBRATED

MAGNETIC FLOWMETER
OF FISCHER & PORTER
one of the very best flow instruments ever invented

A clear length of pipe that accurately measures liquid flow by the invisible MAGNETIC FIELD!
SOMETHING NEW! Measures the flow of any liquid with a conductivity of no less than 0.1 micromho per centimeter.
Measures flow IN EITHER DIRECTION and without auxiliary equipment.
Handily provides full scale recording of ANY FLOW RATE from 1 to 30 feet per second at the TURN OF A DIAL

extends the range of accurate flowmetering to heretofore unbelievable limits!

YOUR ATTENTION INVITED!

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THE PROCESS ACCOUNTANT'S FRIEND

UNMATCHED

FOR ACCURACY

There is a reason why the turbine meter is called the accountant's friend. For accuracy over a wide range of flow it knows no equal. As a billing, accounting, or computer input meter it is *non pareil.*

Do You Ask Why?

Each and every revolution of the bladed rotor signifies the passage of a definite unit of fluid volume with an electrical pulse. The total number of counts—or rotor revolutions—is proportional to total volume of fluid passing through the meter in a given time period.

It Is A Friend To All

The selfsame accuracy, reliability, convenience, and compactness which have endeared the Fischer & Porter turbine meter to the arbiters of process economics have made it the meter of the missile and jet man as well. Few indeed are the test stands that do not rely on the turbine meter for critical flow information.

The Fischer & Porter Turbine Meter

Like other F&P meters it is characterized by a perfection of design and manufacture that lifts it from the commonplace and sets it apart in every respect. A thorough study of pertinent data will assure you that this is no mere boast. We shall gladly aid you in such study to the full extent that life and limb permit, if you will but notify us of your interest.

This company, by purchasing the very finest raw glass of the proper composition and reforming it over mandrels of unexcelled strength, durability, and precision, on machines of our own design, and by calibrating and testing them to perfection, are enabled to offer the best

of an unsurpassed excellence at the lowest market rates. The long experience of the present management of the company, and the enviable reputation they have established for F&P FLOWRATORS are deemed a sufficient guarantee that purchasers can at all times depend upon receiving flowmeters unsurpassed by any others for accuracy and dependability.

NEW
NEW SNAP-IN FLOWMETER #2700
PUSH DOWN, PULL UP . . .
IT IS ALL SET TO GO
For simplicity, accuracy, and service, it is unequalled; while for outright convenience and economy it excels by a large margin any other flowmeter made.
SAVES USERS 50 TO 75% ON INVENTORY

state your pleasure, gentlemen!

To better acquaint our far reaching public with the BENEFITS and ADVANTAGES of our products we have caused to be printed handsome booklets for the general edification. We will gladly post to you a selection of these works upon your application. Make a selection at your leisure from the list below. Sign your name and address in the generous space provided, and send it to us. We are your obedient servants in this as in all other matters.

___2700 Variable-Area Flowmeter
___Variable Head Meter
___Turbine Meter
___Magnetic Flowmeter
___"How To Select Flowmeters"
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Cut disconnect-reconnect time by as much as 50%

The FALK Spacer Coupling is specially designed for quick installation or removal *without disturbing the driving or driven unit.* This feature can save you up to 50% in disconnect-reconnect time when critical equipment—a process pump, for example—needs repair or replacement.

Here's another saving: with the FALK Spacer Coupling, you can quickly realign shafts *without the usual loss of operating temperature!*

And still another: you can remove or reinstall the FALK Spacer as a unit *without draining the lubricant.*

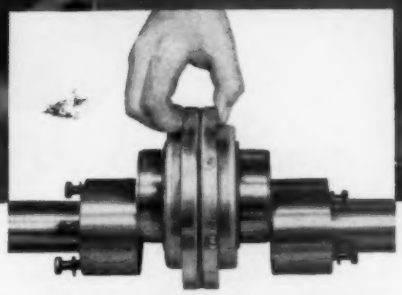
Because of its exclusive grid-groove Steelflex design, the FALK Spacer can accommodate residual misalignment—parallel, angular, or (most important) *both.* Also, it provides torsional resiliency that cushions shock and vibration. Thus it saves wear-and-tear on your connected equipment.

To prove these claims and enjoy these savings, install a FALK Spacer on one application—and see for yourself. Consult your FALK Representative or Authorized Distributor.

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in many principal cities.

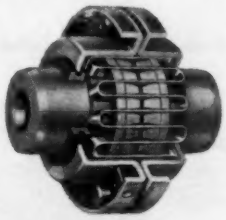


EASY AND QUICK TO INSTALL, DISCONNECT OR RECONNECT

First, mount shaft hubs to allow proper distance between hubs; then, align driving and driven units.

Second, compress Spacer to fit space between hubs and tighten cap screws to pull spacer hubs into the registered fit.

To disconnect, reverse the second step. No draining of lubricant necessary.



The heart of the FALK Spacer ...the basic Type F Steelflex

Write for Service Manual 4838

FALK

...a good name in industry

GUIBERSON TYPE F

AUTOMATIC AIR OPERATED TUBING SPIDER

Handle any length tubing string . . fast . . safe . . sure

BIG, TOUGH, RUGGED, Guiberson Type F Spider makes it possible for one man to handle the longest, heaviest tubing string safely with no scoring or crimping of the tubing. Slips have a long, generous contact with the pipe. Slips maintain 3-point contact for automatic alignment, maximum stability, even load distribution.

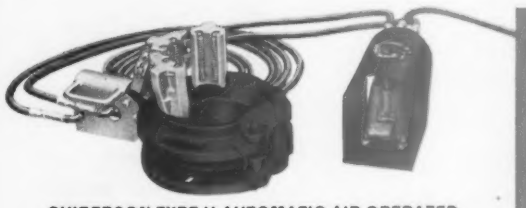
FAST AND SAFE, the Type F Spider speeds-up workover, completion jobs and slim-hole drilling with *hands-free* safety. Slips are released and retracted automatically by a remote control foot pedal, cutting time, eliminating the danger of hand operated slips. Slip inserts are easily and quickly replaced in the field.

SELECTOR ON THE FOOT VALVE provides: (1) single foot-pedal action, depress to retract slips, release to set slips or (2) double foot-pedal action, slips retract when pedal is depressed and released. Pedal must be depressed and released again to return slips to bowl. Both actions can be reversed by reversing hose connections at spider.

TWO OPERATIONAL PRESSURE RANGES are provided, 80-125 psi or 40-80 psi. Changing from one range to the other is a simple operation at the spider.

Save time . . gain extra safety . . with Guiberson Type F Spider . . get complete information from a Guiberson man or see it at your supply store.

Sold by Oil Field Supply Stores Everywhere



GUIBERSON TYPE H AUTOMATIC AIR OPERATED TUBING SPIDER is a short, compact version of the Type F . . designed for medium depth wells up to 9,000′ for 2⅜″ O.D., 8,000′ for 2⅞″ O.D., or 6,000′ for 3½″ O.D. tubing.

SAFE THAN SORRY BETTER BE GUIBERSON

THE GUIBERSON CORPORATION

ESTABLISHED 1919

DALLAS, TEXAS U. S. A.

ONLY VISIBLE BLADES GIVE YOU SAFETY YOU CAN SEE!

• The men who pull the switches will tell you what can happen when a switch, *believed* to be open —*isn't*. A lot of things can happen—and every one of them is bad. Personnel safety is in jeopardy. Motors can single-phase. Machinery and work can be damaged. Down-time can skyrocket.

Doesn't it make sense to insist on **V**isible **B**lade construction which gives you a road block against any of those possibilities? Doesn't it make equally good sense to insist on the safety switch which gives you that construction—plus a lot of other performance advantages? Evidently it does, because *Square D switches have never been out of first place in more than 50 years!*

They cost no more... why settle for less?

MAIL the coupon for latest Safety Switch Bulletin

Square D Company, Dept. SA-128
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Please send me your latest SAFETY SWITCH BULLETIN

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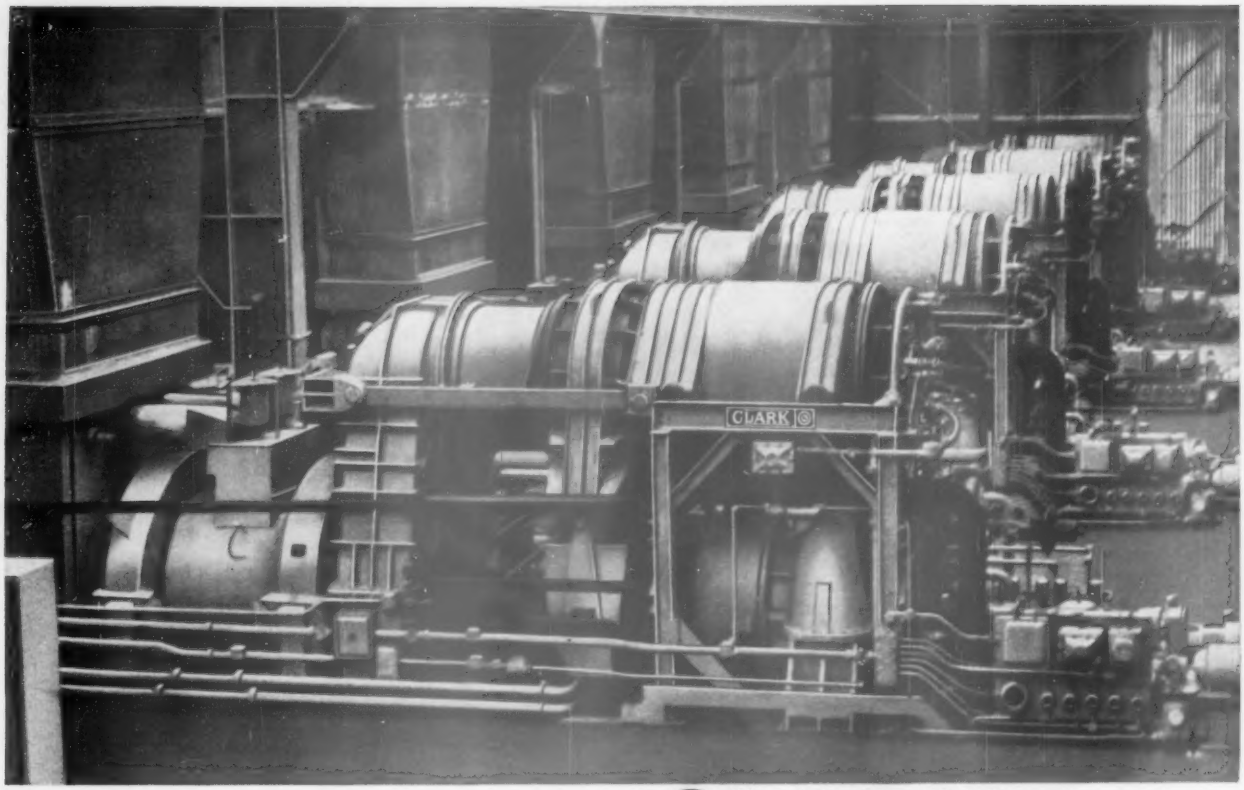
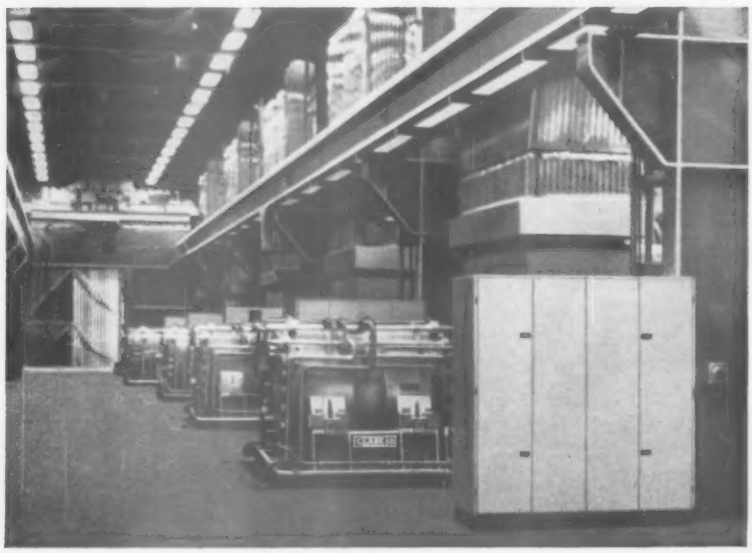
SQUARE D COMPANY

wherever electricity is distributed and controlled



Five Clark Model 305 Gas Turbines drive Clark vertically-split centrifugal compressors operating in series. The station is highly automated with only two operators required per shift.

CLARK Gas 210,000,000



In the Arabian Desert...

At 'Ain Dar, Saudi Arabia, five Clark Model 305 Gas Turbines are driving Clark Vertically-Split Centrifugal Compressors for the gas injection program of the Arabian American Oil Company.

Surrounded on all sides by the torrid Arabian desert, the turbines and compressors are installed in a pressurized building to keep out wind driven sand. Available fuel for the turbines is sour gas while ambient temperatures soar to unusually high levels.

The 'Ain Dar injection plant draws gas from five gas-oil separator plants at a pressure of 125 psig, compressing it to 2100 psig for injection. Any four of the five series connected, turbine-driven Clark compressors can provide the necessary pressure ratio for injection. Maximum flexibility is achieved by the use of dual shaft gas turbines. An additional Model 302 turbine drives a 5600 KW generator to power the gas-oil separator plants.

Turbines Power Aramco SCFD Gas Injection Plant

Proved dependability, minimum maintenance and the low installation costs experienced by other users of Clark gas turbines were important factors in selecting the turbines and compressors for the 'Ain Dar plant.

The fact that some of the Clark turbines and compressors could be delivered from the Olean plant and the balance from Italy, was also of prime importance to Aramco.

Clark 305 and 302 gas turbines have a standard rating of 8700-9300 bhp. 1220 bhp. models are also available. Consult your Clark representative for your next gas turbine or centrifugal compressor project or write for descriptive literature.

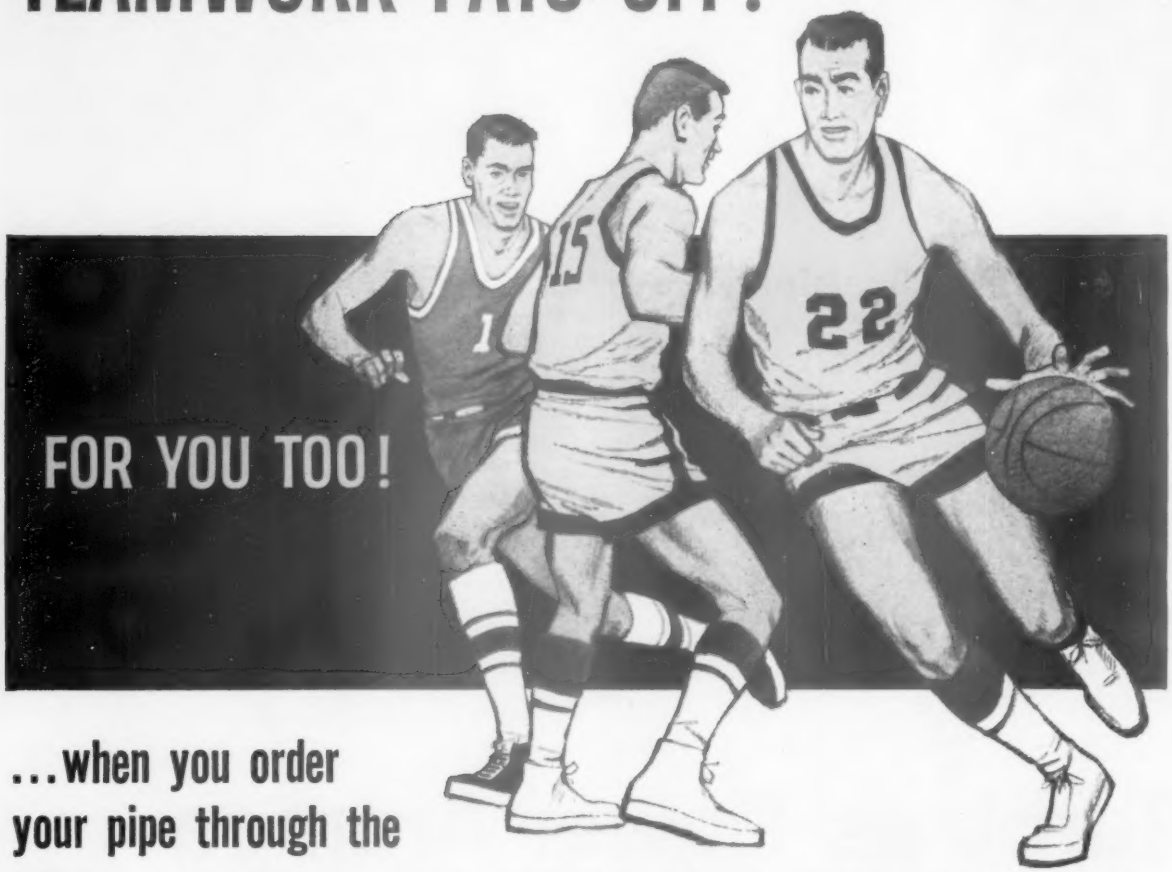
CLARK

ONE OF THE DRESSER INDUSTRIES

CLARK BROS. CO.
OLEAN, N. Y.
One of the Dresser Industries

COMPRESSORS • GAS TURBINES

TEAMWORK PAYS OFF!



...when you order your pipe through the

WHEATLAND PRODUCER-JOBBER TEAM

INSIST ON PIPE MADE IN U.S.A.

You can be sure this winning combination will supply you with steel pipe of unvarying high quality, job after job. And your Wheatland distributor sees to it that you get the pipe you need . . . on time!

See your Wheatland Pipe Distributor for black or galvanized Wheatland Steel Pipe.

...pipe with the yearmark!

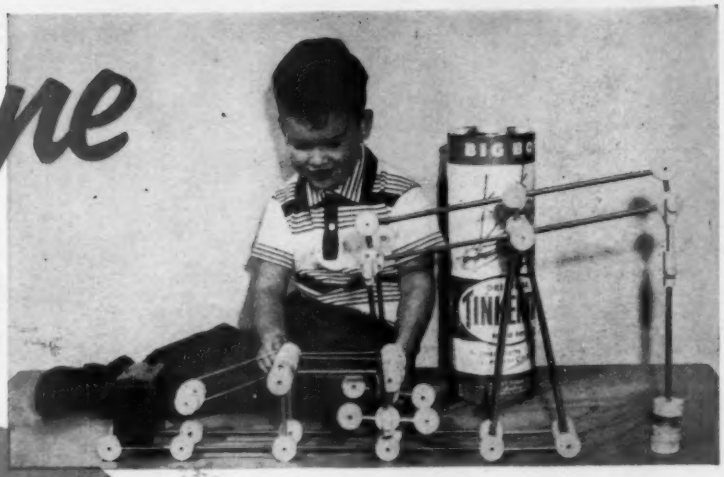
WHEATLAND STEEL PIPE

WHEATLAND TUBE COMPANY
Bankers Securities Bldg., Phila. 7, Pa.
MILLS: Wheatland, Pa. • Delair, N. J.

API LINE PIPE IN ACCORDANCE WITH AMERICAN PETROLEUM INSTITUTE SPECIFICATIONS

Anyone

CAN BUILD A PUMPING UNIT



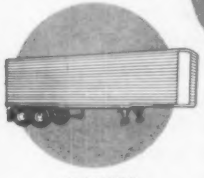
But... it takes EXPERIENCE to build a unit that can TAKE IT!

LUFKIN ENGINEERS HAVE LEARNED THE HARD WAY!

35 YEARS EXPERIENCE in building quality pumping units have proven beyond all doubt that LUFKIN'S generous design factors and husky, rugged construction are absolutely necessary for long life and trouble free service!

PUMPING UNITS

GAS ENGINES



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SPEED INCREASERS AND REDUCERS

You Can Relax When Your Lease Is **LUFKIN EQUIPPED**

LUFKIN FOUNDRY & MACHINE COMPANY

LUFKIN, TEXAS

Branch Sales and Service

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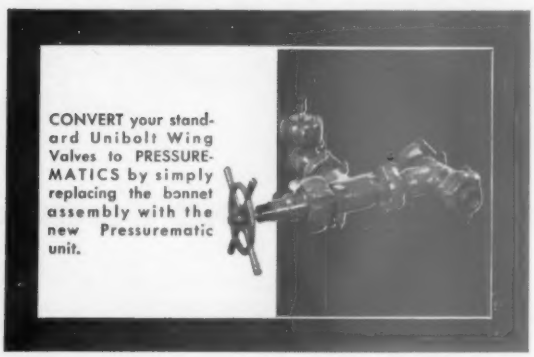
Lufkin equipment in Canada is handled by
THE LUFKIN MACHINE CO., LTD., 9950 65th Avenue, Edmonton, Alberta, Canada, Regina, Saskatchewan, Canada

NOW, YOU CAN MAKE YOUR XMAS TREES SAFER THAN EVER!

The New Unibolt Pressurematic Wing Valve

- ***Automatically shuts in the well when flowline pressures rise or fall beyond desired limits.***
- ***Permits manual operation for choke changing.***

A broken flowline or the failure of any unit in the separator, heater-treater, or gathering manifold that would cause the flowline pressure to *drop,* would automatically and instantly close the Pressurematic Wing Valve and shut in the well. Any obstruction in the flowline, such as paraffin, that would cause the flowline pressure to *rise,* would also actuate the Pressurematic Valve to closed position.

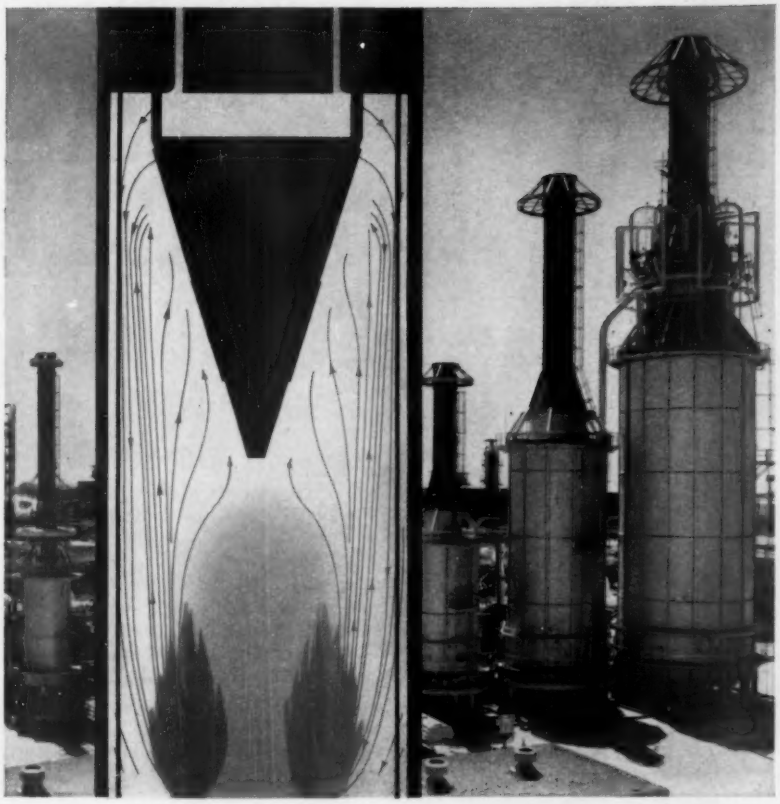

CONVERT your standard Unibolt Wing Valves to PRESSUREMATICS by simply replacing the bonnet assembly with the new Pressurematic unit.

No springs are employed in the Pressurematic Valve. Its design incorporates the long-established engineering principle of balancing a small diameter piston which is exposed to high pressure (wellhead) against a large diameter piston which is exposed to low pressure (flowline). When this balance is disturbed — in excess of pre-determined limits — the pistons move and thus actuate the gate, or stem. This movement is to the closed position only. When the valve closes it can be opened with the handwheel and reset for automatic operation. The handwheel also permits manual operation of the valve for choke changing, etc.

Complete details will gladly be sent on request.

THORNHILL UNIBOLT **CRAVER CO.**
P. O. BOX 1184 HOUSTON, TEXAS

PUTTING THE HEAT ON EVENLY EFFICIENTLY



Petrochem Isoflow Furnaces give even heat distribution—with added convection sections for maximum fuel efficiency

This is the heart of Petrochem Isoflow Furnaces—the furnaces that get more heat from every measure of fuel. Only Petrochem incorporates all three critical design features so important to highest efficiency in fired heaters: 1) burners specifically designed to furnace needs, 2) properly engineered firebox proportions, and 3) reradiation cones. These factors add up to a more even heat distribution and maximum heat efficiency. Even greater heat efficiency for certain heater applications can be obtained with Petrochem's added convection sections.

Cleaning is easier than with ordinary horizontal-type heaters. Only 25 per cent of the space normally needed is required to pull the tubes of a Petrochem furnace. When specifying furnaces—remember, *there are more Petrochem Isoflow Furnaces in service today than any other make.*

YUBA

specialists in process furnaces for every size, capacity and duty

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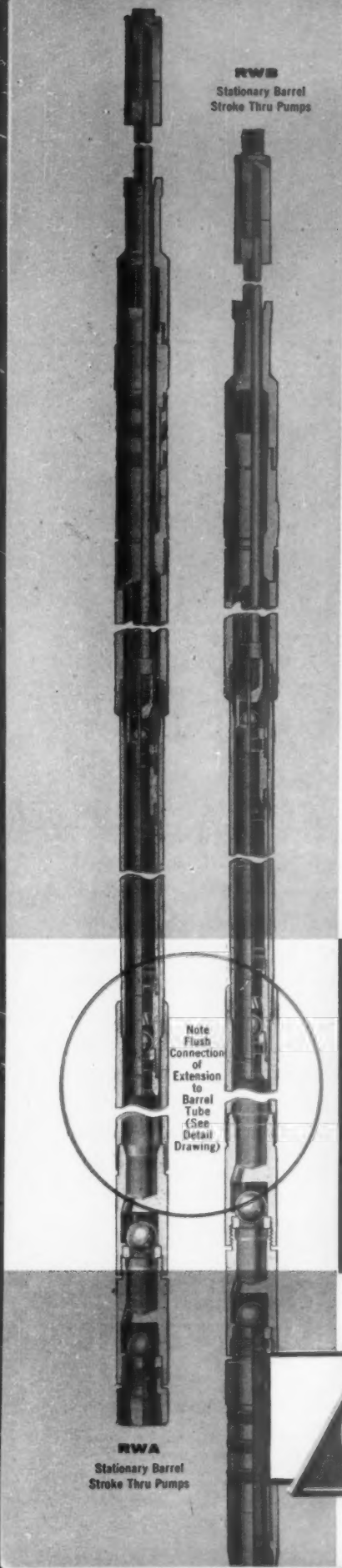
REPRESENTATIVES: Faville-LeValley Corp., Chicago • Flagg, Brackett & Durgin, Inc., Boston • D. D. Foster Co., Pittsburgh • William H. Mason Co., Tulsa • Lester Oberholtz Assocs., Los Angeles • Rawson-Houlihan Co., Inc., Baton Rouge • Rittelmeyer & Co., Atlanta • H. W. Severance, Prospect, Ky. • Turbex Equipment Co., Narberth, Pa. • G. M. Wallace & Co., Denver, El Paso & Salt Lake City • Combustion & Power Equipment Ltd., Montreal & Toronto • International Licensees and Representatives: Birwelco Ltd., Birmingham, England Fujinagata Shipbuilding Ltd., Osaka, Japan • Heurty Italiana, S.P.A., Milan, Italy • Petrochem, G.M.B.H., Dusseldorf, Germany • SETEA S.A., Buenos Aires, Argentina Societe Anonyme Heurtey, Paris, France • Societe Anonyme Belge Heurtey, Liege, Belgium.



Continental-Emsco

D+B HEAVY DUTY STROKE THRU SUBSURFACE PUMPS

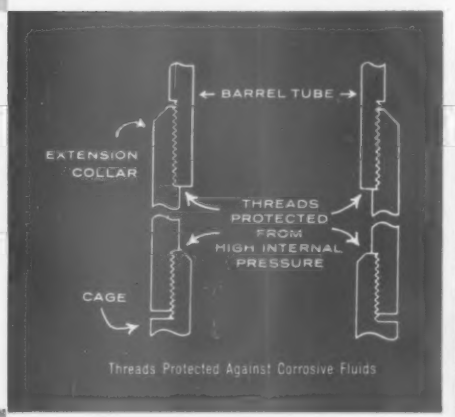
. . designed for pumping deepest wells and wells with severe operating conditions

Sand, gyp and paraffin are swept out of the barrel with each plunger stroke in these pumps. This prevents foreign matter from freezing the plunger in the barrel tube. Uniform wear of the *complete* barrel, achieved by the stroke thru design, makes practical the insertion of an oversize plunger for longer barrel life. A regular pump design forms "rings" of unworn metal at each end of the barrel which prevents the use of oversize plungers. D+B Stroke Thru design eliminates this problem.

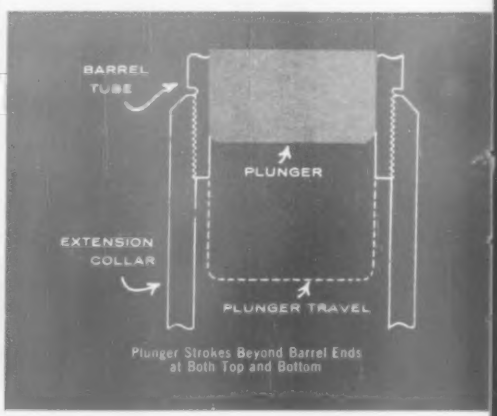
Extension collars make up flush with tube shoulders to cover and protect threads against accelerated failure caused by corrosive fluids. This D+B design also provides greater strength, where high internal pump pressures are encountered.

Extra strength required for deeper pumping is built into these pumps by increasing the barrel tube wall thickness and by simple design. Thicker walls also wear longer in severe abrasive wells, regardless of depth.

D+B Heavy-Duty Stroke Thru pumps are typical of the *designing-for-a-specific-application* that so characterizes D+B engineering concept. Talk to your D+B specialist *first* . . 37 D+B subsurface pump types with over 700 variations give you a wide selection . . a way to more economical pumping.



Threads Protected Against Corrosive Fluids



Plunger Strokes Beyond Barrel Ends at Both Top and Bottom

For Service that Sings . . Equipment that Hums . . Go . .

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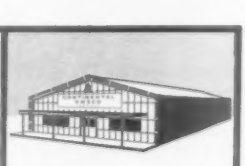

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P902

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Davison Hi-Sorb Silica Gel dries better

That's why Davison Silica Gel is so often to be found in natural gas dehydrators . . . in gas streams . . . in the refinery. Davison Silica Gel prevents hydrate formation which clogs lines, causes high-pressure losses and high maintenance costs. It decreases corrosion in equipment and reduces power costs in compression. Not least—it keeps customers happy! There's nothing better obtainable. Write Department 31101 today for full information.

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W.R. GRACE & CO.

DAVISON CHEMICAL DIVISION

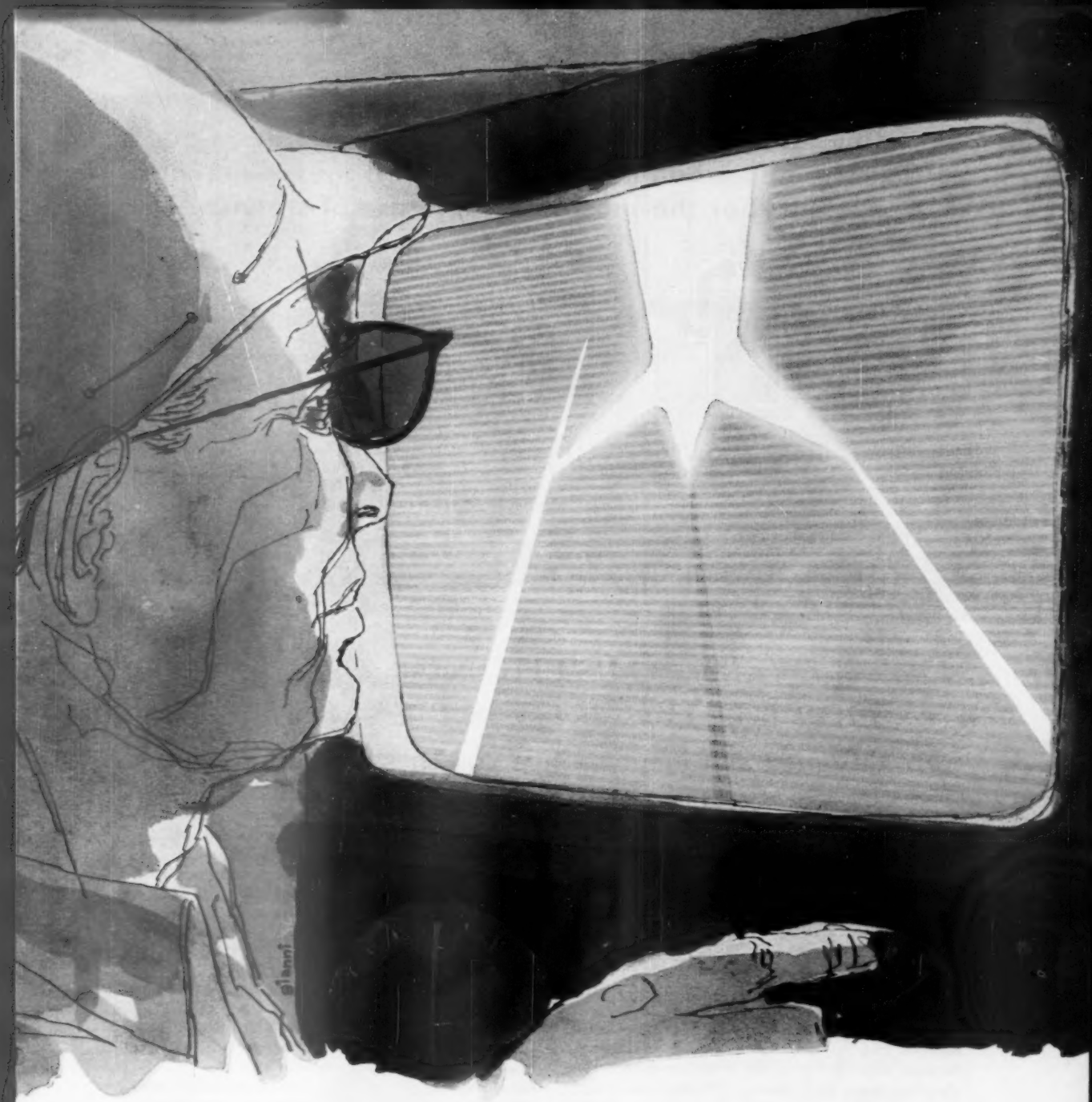
BALTIMORE 3, MARYLAND

Spying on a weld

A TV camera is the spy! Located inside that hulking section of USS National Electric Weld Line Pipe, it's a visual guide to accurate welding.

The operator welds by remote control. He uses push buttons to operate a welding head inside the pipe. Just in front of the welding head is a short-focus TV camera.

When the image flashes on the TV screen, the operator sees reference lines and uses them as a guide. This enables him to keep the electrodes for the inside weld centered on the seam of the formed plate. *In short:* the TV camera makes precise guiding of the welding possible.



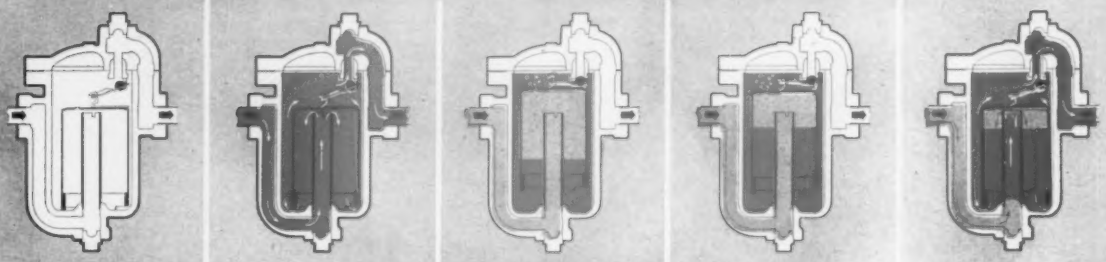
The constant development and improvement of production techniques are just two of the reasons why National Tube is not only the largest but also the most experienced manufacturer of tubular products in the world. For more information on USS National Line Pipe, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. Ask for bulletin #23.

USS and National are registered trademarks

National Tube
Division of
United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York

This simple trap operating principle provides the efficiency, dependability and freedom from maintenance necessary for the most profitable use of steam



When trap is first installed, the inverted bucket is down and the valve is wide open.

When steam is turned on, condensate (solid color) flows into trap and out through discharge orifice, until —

Steam (light color) reaching the trap floats the inverted bucket and closes the valve.

When more condensate enters the trap, the bucket loses buoyancy and pulls on valve lever.

When weight of bucket times leverage overcomes pressure on valve, bucket sinks and opens trap.

Key: condensate steam steam bubbles air bubbles

ARMSTRONG INVERTED BUCKET STEAM TRAPS

are designed and made to give you these big benefits:

● Amstrong Traps, the first inverted bucket steam traps, now represent the most advanced development of this time-proven principle. They provide all the advantages necessary for efficient, economical condensate drainage from virtually all types of steam using equipment.

1. *No steam loss* – Steam never reaches the orifice even when there is no condensate load.
2. *Automatic air elimination* – Vent in trap bucket passes air and other non-condensibles through to be discharged with condensate.
3. *No cooling leg required* – Condensate is discharged at steam temperature as fast as it reaches the trap because trap operates on difference in density between steam and water not on temperature.
4. *Operates on any back pressure* – Failure of one trap in system will not cause others to open because high back pressure does not affect an Armstrong trap other than to reduce capacity. As long as there is a pressure differential across the orifice the trap will close on steam and open for condensate.
5. *Unaffected by ordinary dirt* — Swirling action of condensate keeps dirt in suspension until discharged with condensate, prevents it from lodging in valve.
6. *Completely dependable* — Proved design plus the use of all stainless steel working parts assure continuity of service and length of service unmatched by any other trap.
7. *Big capacity in a small, economical package* — Armstrong design gives you the highest practical capacity for any given pressure. And remember, Armstrong capacity ratings are based on *hot* condensate at the *working pressure differential* stated, not on theoretical orifice capacities.

Further information on these advantages plus much additional information is given in the 48 page Armstrong Steam Trap Book. Ask your local Armstrong Representative or write direct.

860 Series for low pressure heating service.

800 Series, side inlet, side outlet.

No. 801, side inlet, bottom outlet.

880 Series, integral strainer.

200 Series, bottom inlet, top outlet.

Forged Steel Series for high pressures, high temperatures.

The 48 page Armstrong Steam Trap Book tells how to correctly size, install and maintain steam traps for any pressure, any temperature, any load plus full catalog data on Armstrong Steam Traps. Ask for Catalog K.

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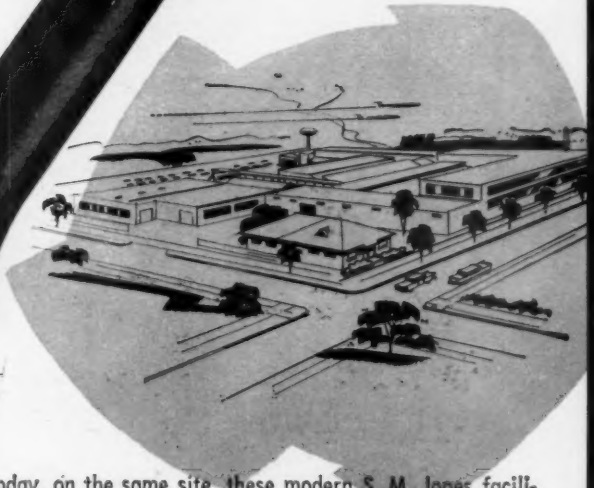
"See Our Catalog in Refinery Catalog"

JONES

FIRST IN 1894...

S. M. Jones produced the first all-metal sucker rods in 1894 under the name of the Acme Sucker Rod Company in Toledo, Ohio...

FIRST TODAY...



Today, on the same site, these modern S. M. Jones facilities are devoted exclusively to designing and manufacturing the finest sucker rods in the world.

...because we're Sucker Rod Specialists!

There are four JONES JOB-ENGINEERED SUCKER RODS... a type for every pumping need!

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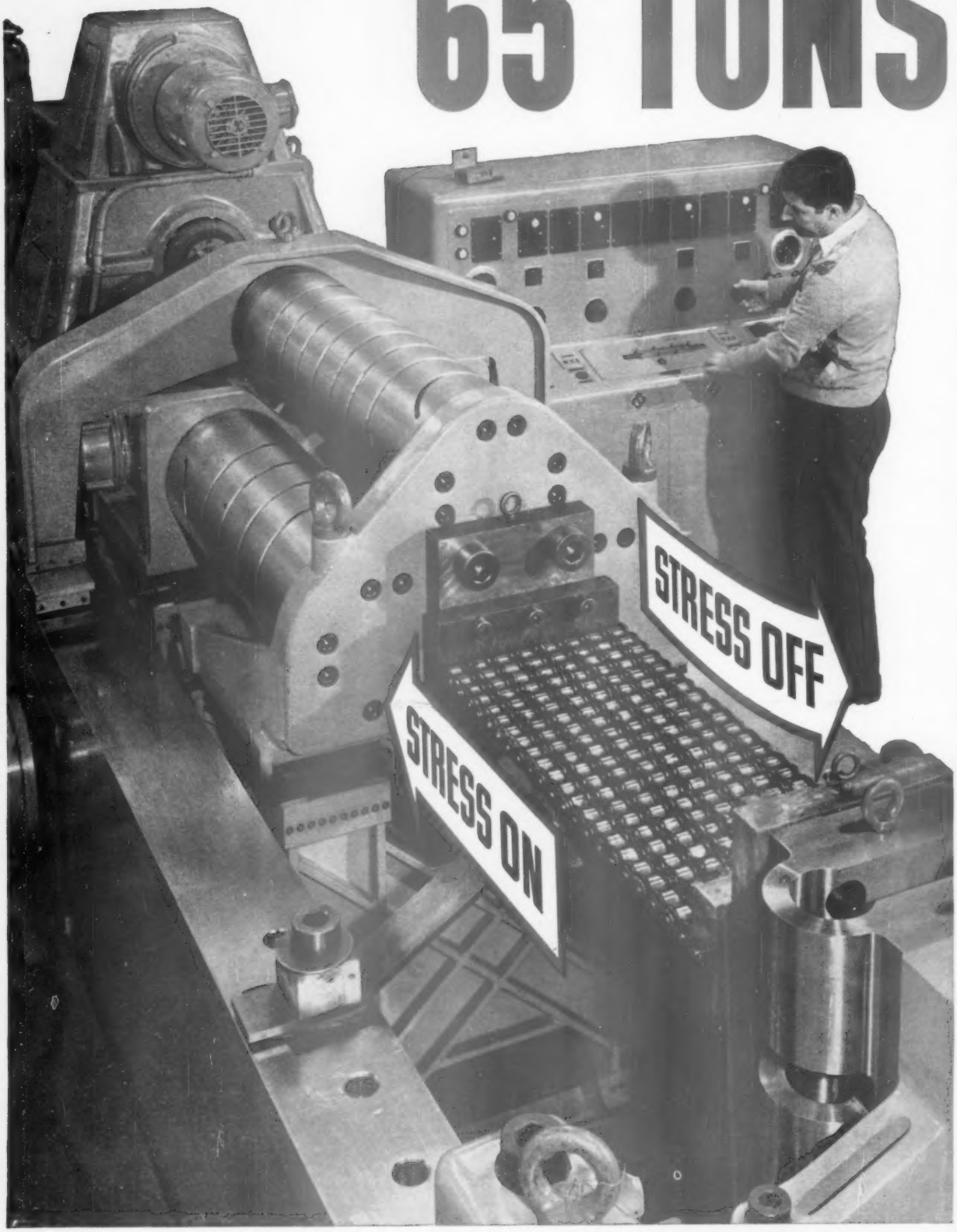
Franklin Supply Company, Export Division, Inc., New York

65 TONS



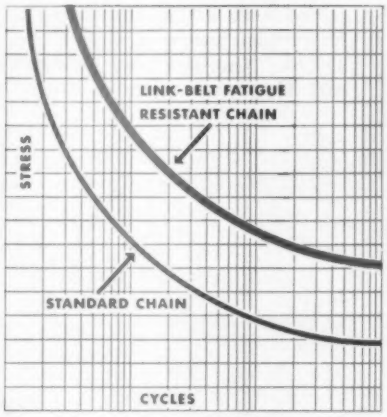
# of cyclic tension

Lab test proves the unexcelled fatigue strength of LINK-BELT roller chain with FR ®FATIGUE RESISTANT

The equipment you see here — largest of its type known to be in operation in roller chain testing — enables Link-Belt to test and rate the largest-pitch, multiple-width chains used on today's drilling rigs. Its rapid "stress-on, stress-off" action duplicates the toughest conditions of rig operation at a greatly accelerated pace. It proves conclusively (see chart) the superior *fatigue resistance* imparted to roller chain by the FR process.

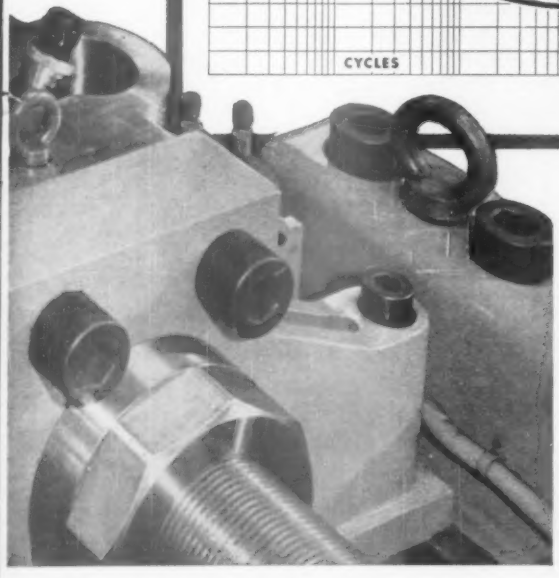
From such unequalled facilities for research comes roller chain unsurpassed in its ability to withstand the tremendous tensions of drilling service. In fact, Link-Belt can state without reservation: *No other roller chain has greater capacity to withstand the smashing impacts and tortuous stresses met in day-to-day drilling.*

FR and many other "extras" are standard with all Link-Belt oil field roller chains. Get full data in Catalog 2880, from any leading supply store.



U.S. Patent No. 2,517,497

This is FR. By compressing metal around pitch holes, Link-Belt greatly strengthens the critical sidebar areas most vulnerable to fatigue failure and greatly increases the chain's *dynamic strength.*



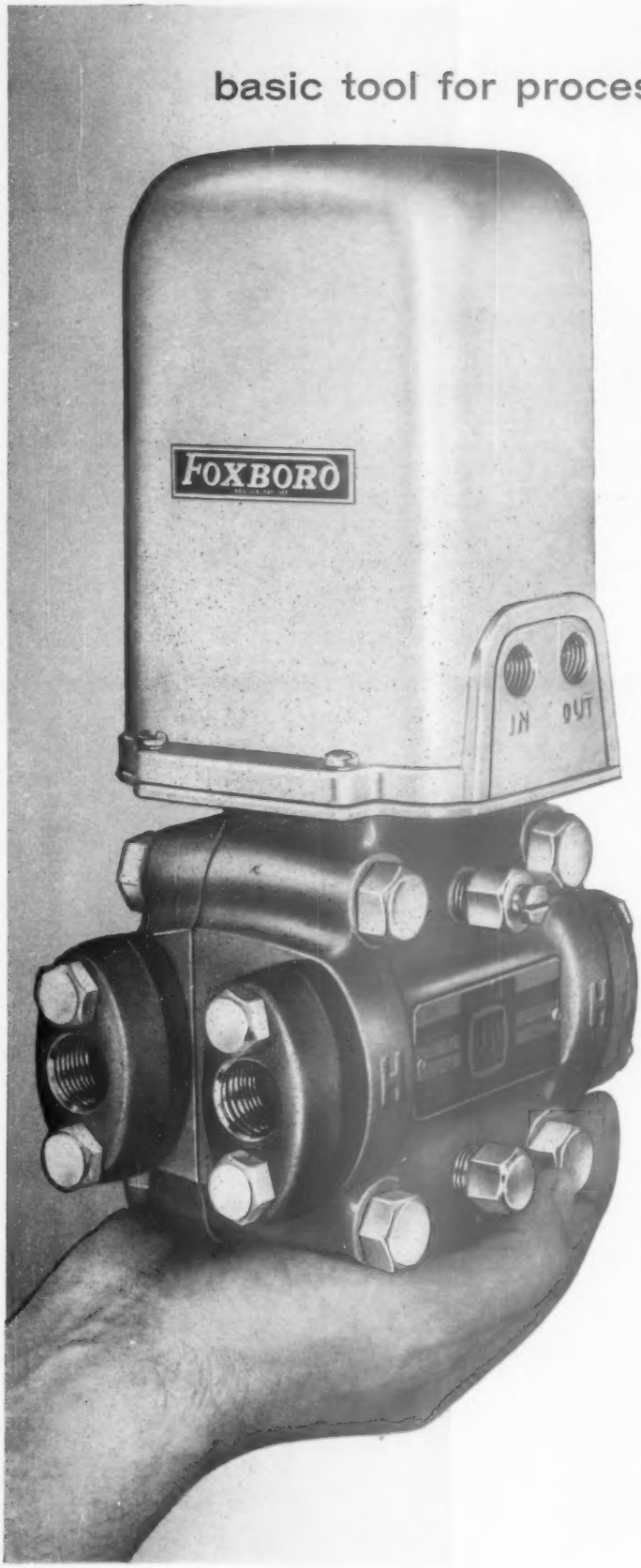
LINK-BELT

14,928

ROLLER CHAINS & SPROCKETS

LINK-BELT COMPANY: Indianapolis 6, Houston 1, Dallas 26, Odessa, Tex., New Orleans 16, Shreveport La., Los Angeles 22 (Montebello), Scarboro (Toronto 13); Export Office, New York 7. Distributors in All Fields.

basic tool for process measurements . . .



FOXBORO d/p CELL* TRANSMITTERS

Positive overrange protection . . . no perceptible zero drift . . . high sustained accuracy, even under the most punishing operating conditions.

D/p Cell bodies are available in 316 s.s. or rustproofed carbon steel. Unique stainless steel twin-diaphragm capsule is specifically designed to provide positive overrange protection. Purged cover protects transmitter from weather, dust, and fumes.

You can install d/p Cells anywhere — in any position — simply and conveniently, and know they'll give unequaled accuracy and performance. Ask your Foxboro Field Engineer for complete details, or write for Bulletin 13-11A. **The Foxboro Company, 601 Neponset Avenue, Foxboro, Mass.**

Foxboro d/p Cells for flow, liquid level, and other variables

- for high-speed flow measurement and control
- for flow measurement as small as 0.03 gpm
- for flow under static pressures to 6000 psi
- for use where elevated or suppressed ranges are required
- for electronic flow control systems
- for liquid level
- for comparison of process and sample fluids
- for absolute pressure measurement

*Reg. U. S. Pat. Off.

Three fully adjustable ranges:
0-5 to 0-25 inches of water
0-20 to 0-250 inches of water
0-200 to 0-850 inches of water
Working pressures of 500, 1500, and 6000 psi

FOXBORO
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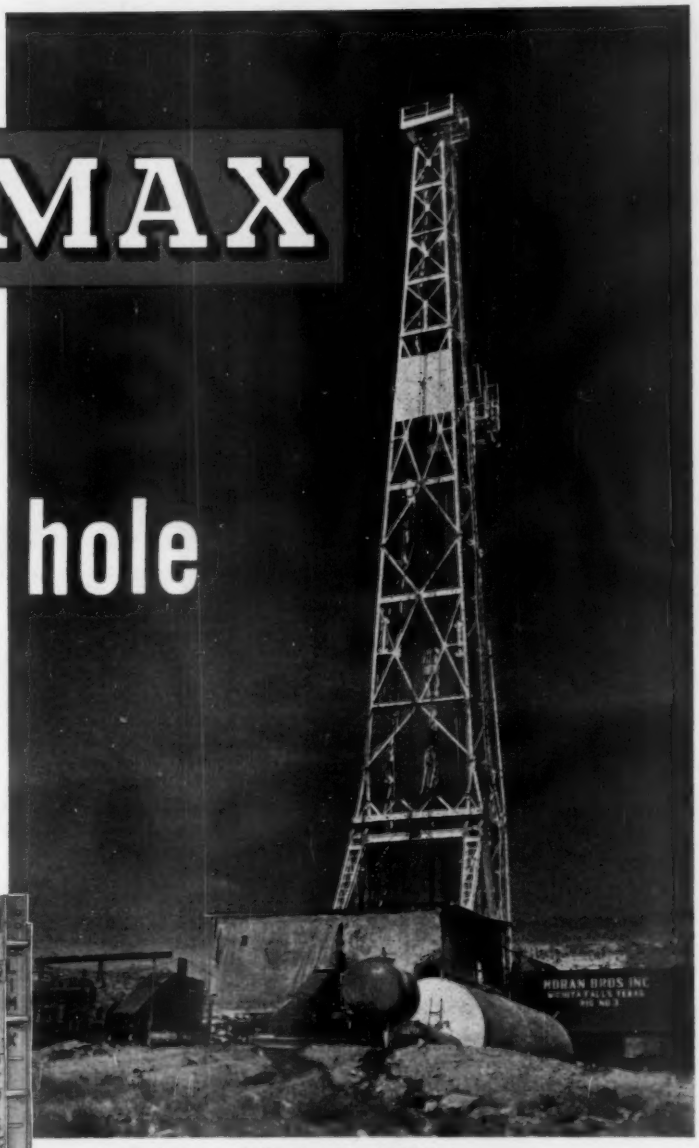
IT'S CLIMAX

for the 44-inch hole

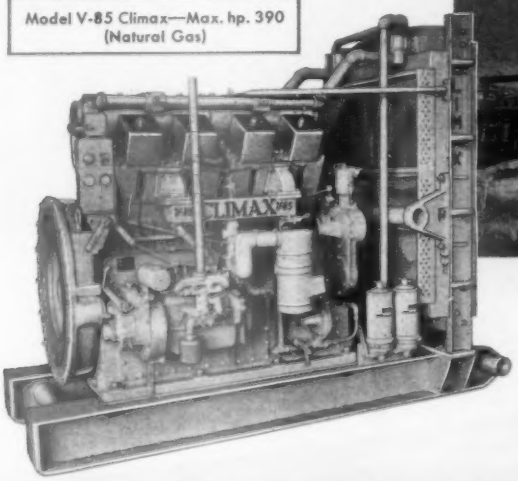
TWO V-85 CLIMAX ENGINES ON TOP
...HANDLE 122 TONS IN THE HOLE

[Reamer bit, four collars, basket, and 965 feet of 13⅜-inch pipe weigh 244,000 pounds in the hole.]



Moran Bros., Inc., Rig No. 3, making 44-inch hole in solid granite, 85 miles north of Las Vegas.

Model V-85 Climax—Max. hp. 390 (Natural Gas)



Climax Engines have proven their reliability in hundreds of oil field installations. Single, well balanced design, rugged construction, and quality materials make them smooth running . . . for years!

CL-112

POWER UNIT PUMPING and DRILLING HP—CONTINUOUS DUTY									
MODEL	Bore and Stroke	Displacement	Torque @ RPM	BRAKE HORSEPOWER AT SPEEDS INDICATED					
				600	700	800	900	1000	1100
R-110	6⅛ x 7	824	468 @ 800	52	62	71	79	86	91
R-165	6⅛ x 7	1238	684 @ 750	81	93	105	117	127	135
K-67	7 x 7	1616	955 @ 805	110	129	145	161	176	188
K-75	7½ x 7	1855	1090 @ 800	126	146	166	185	204	218
V-80	7 x 7	2155	1240 @ 850	140	165	188	210	230	246
V-85	7½ x 7	2474	1440 @ 900	164	194	223	246	266	284
V-122	7 x 7	3232	1915 @ 900	217	258	293	328	353	378
V-125	7½ x 7	3711	2220 @ 850	242	292	340	384	417	442

Write for descriptive literature

CLIMAX ENGINE MANUFACTURING CO. • DIVISION OF WAUKESHA MOTOR COMPANY
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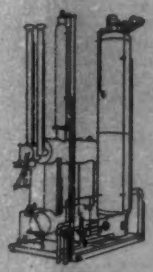
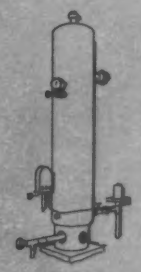
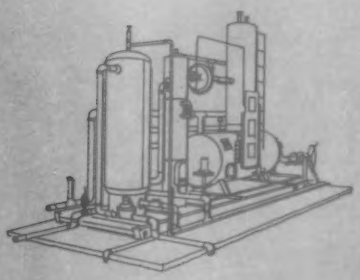


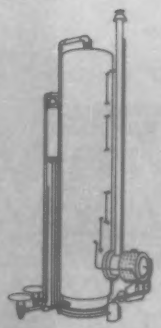
GLYCOL DEHYDRATORS



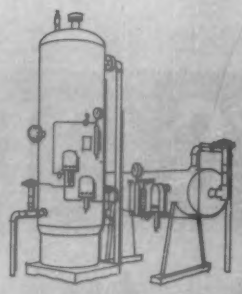
KNOCKOUTS AND OIL SKIMMERS



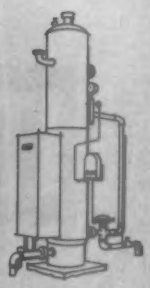
HYRECOS



EMULSION TREATERS



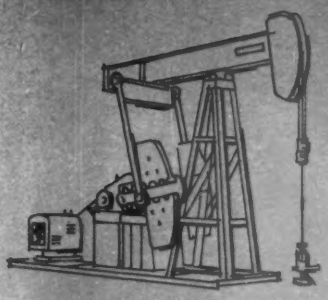
SEPARATORS



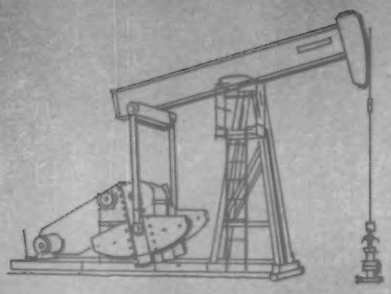
METERING EQUIPMENT

PARKERSBURG..

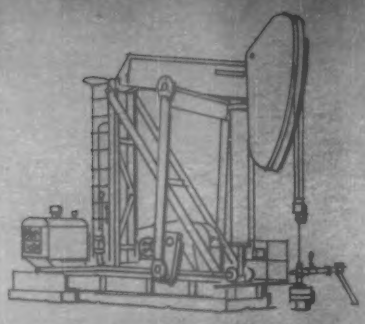
PARKERSBURG . . . The FULL LINE in PUMPING UNITS



CHAIN



GEARED



PNEUMATIC

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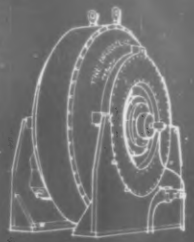
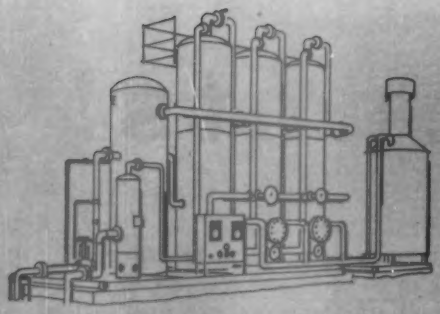
METAL BUILDINGS

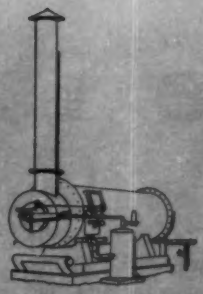


HYDROMATIC BRAKES



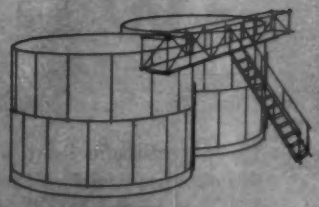
DYNAMIC ADSORPTION UNITS

SCRUBBERS



PRODUCTION AND PROCESS HEATERS

STABILIZERS



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Parkersburg . . . and **only** Parkersburg . . . builds, sells and services a full line of production and processing equipment . . . **quality** equipment backed by Parkersburg's 63 years of know-how and experience in the oil patch. Whatever your needs . . . for fine products, full service and fair prices, specify Parkersburg.

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THE PARKERSBURG RIG & REEL COMPANY

Division of Parkersburg-Aetna Corp.

PARKERSBURG • HOUSTON • COFFEYVILLE

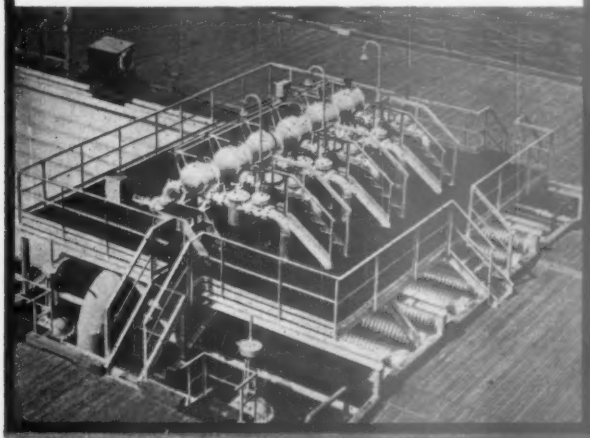
BiRotor Versatility

-where it counts!

In intermittent light and heavy service, this Brodie 6-meter manifold on the wharf of Kuwait Oil Company Limited, in the Middle East is called upon for pipeline, barge and tanker service at every possible rate from 400 to 12,000 bbls. per hour. A centrally controlled operation, the entire thruput can be accumulated on a single remote counter in the dispatchers office, with one or all *BiRotors* in operation. Any Brodie Meter in the manifold may be serviced or proved while other meter or meters take the flow.

In every bulk transfer operation—from wellhead to truck-tank delivery—you never have to "Baby" a Brodie *BiRotor*. They're precision engineered to operate at full rated capacity. Whatever your metering need, call your nearby Brodie Metering Specialist. 917

At Kuwait Oil Company Limited, A Brodie 6-Meter Manifold Handles From 400 to 12,000 bbls. per Hour-With Equal Dependable Accuracy!



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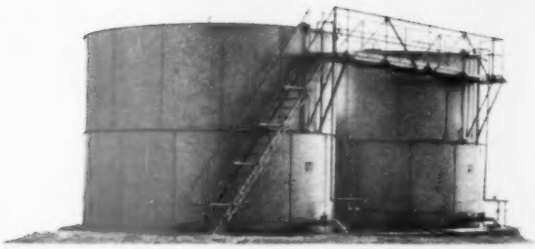
EVERYWHERE · BRODIE is linked with Progress. Here's another example from the MIDDLE EAST

REPRESENTATIVES WITH STOCKS AND SERVICE FACILITIES IN ALL PRINCIPAL CITIES



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Proficient, General team-mate crews are immediately accessible to any oil area. In the western hemisphere or abroad, their prime objective is to increase your percentage of successful exploration.

HOW? By supplying more accurate data.

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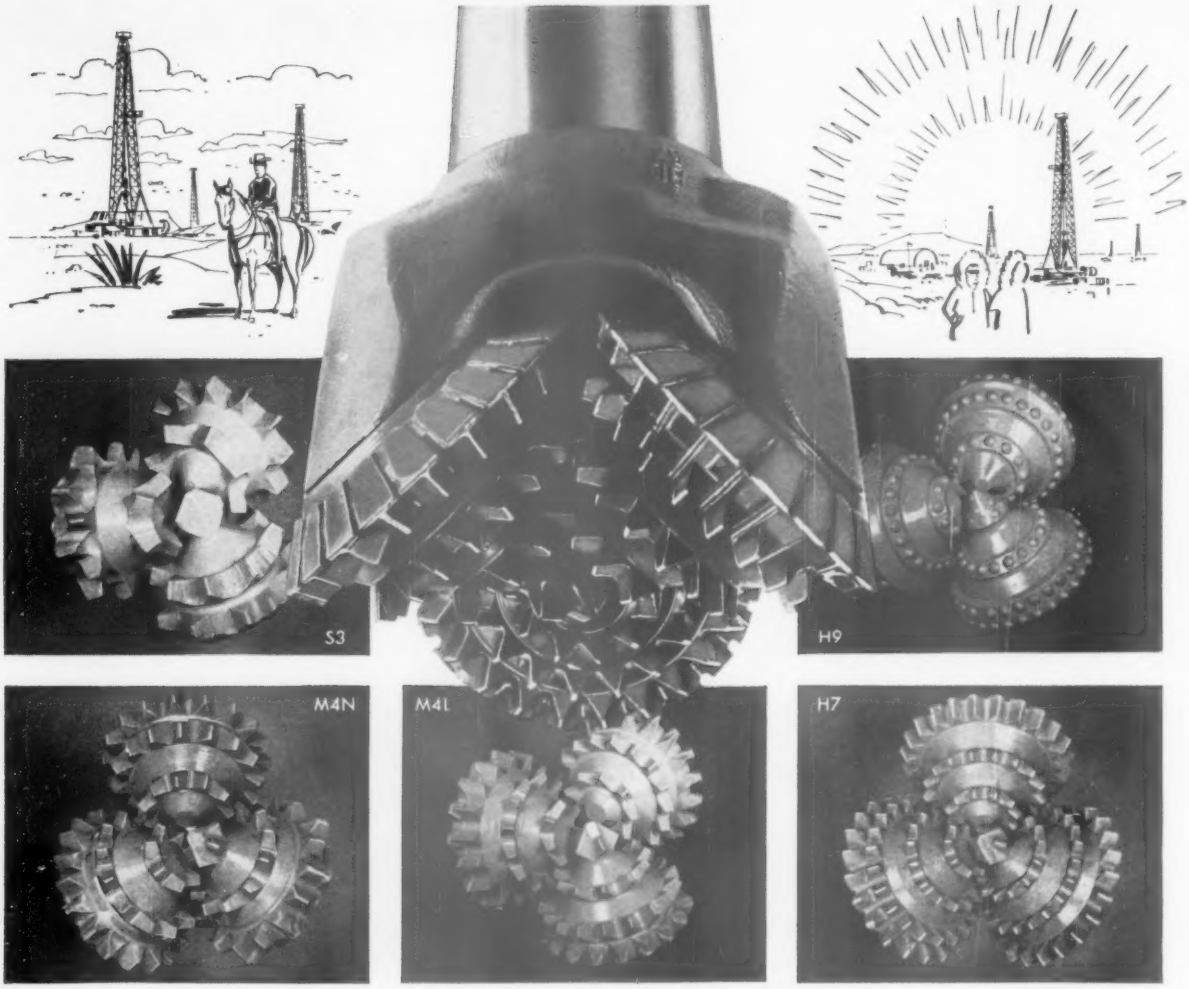
WHEN YOUR CONTRACT IS WITH GENERAL, THE PERCENTAGE FOR SUCCESSFUL EXPLORATION IS IN YOUR FAVOR !



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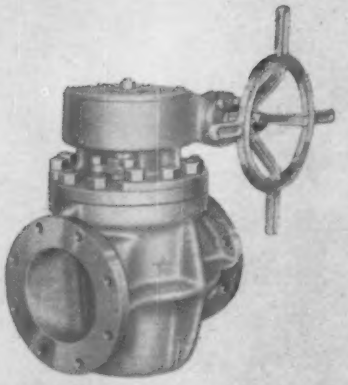


Fig. 3059G—300-Pound Steel Lubricated Plug Valve. Bolted gland type, gear operated. Sizes 6" to 12".

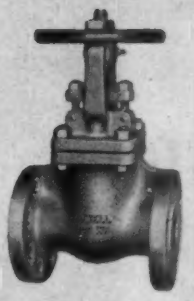


Fig. 2467—Small 300-Pound Stainless Steel O.S. & Y. Gate Valve.

Fig. 6061—600-Pound Steel Swing Check Valve.

Fig. 2201—175-Pound W.O.G. Semi-Steel Lubricated Plug Valve. Single gland type.

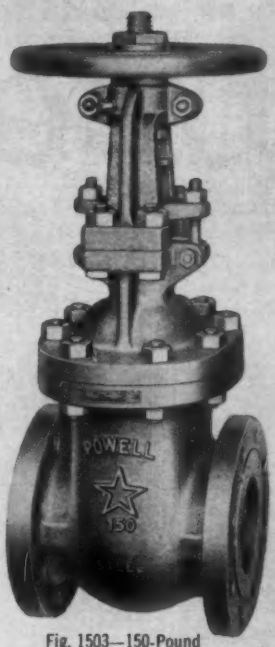


Fig. 1503—150-Pound Steel O.S.&Y. Gate Valve.

Fig. 375—Bronze Gate Valve for 200 pound W.S.P. Union bonnet, inside screw rising stem.

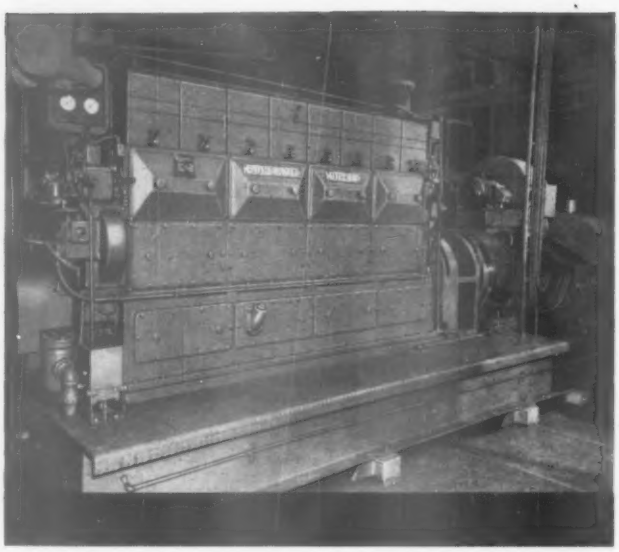
POWELL...

world's largest family of valves

FOR EVERY FLOW CONTROL PROBLEM Powell offers more kinds or types of valves, available in the largest variety of metals and alloys, to handle every flow control requirement. Your local valve distributor will be glad to tell you all about them. Or write to us for the full facts.

THE WM. POWELL COMPANY • *Dependable Valves Since 1846* • **Cincinnati 22, Ohio**

Typical engine-generator set in use by Dixilyn Drilling Corp. on the "Julie Ann." Superior 8-cylinder diesel drives 500 KW generator and fluid coupling to provide both electrical and mechanical power.



new rig power with four-way flexibility ...White's DRILLECTRIC*

COMPLETE POWER RANGE—263 POSSIBLE COMBINATIONS

Drillectric—all-electric or electro-mechanical systems—now offers the broadest possible range of power units for oil well drilling. An extensive line of Superior engines, completely packaged with generators, motors and other components permits up to 263 combinations.

CHOICE OF DIESEL, DUAL-FUEL OR GAS

Choose from 5 diesel and dual-fuel engines, or 2 gas engines. Engine-generators can be specified in groups of 2 to 4 in "building block" fashion, so you can customize your rig. You can interchange groups of gas or diesel engines or swing from gas to diesel power in dual-fuel models.

ALL-ELECTRIC OR ELECTRO-MECHANICAL SYSTEMS

All-electric systems use electric motors for all power driven equipment. Electro-mechanical systems use electric motors for draw-works and rotary table and compounded mechanical power between engines and mud pumps. The number of electrical components is reduced to a minimum commensurate with practicability and safety.

FREEDOM OF POWER LOCATION ON RIG

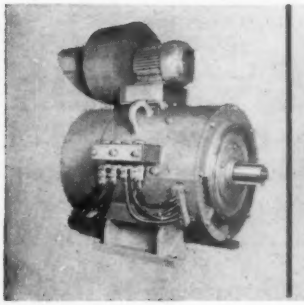
In either system, group composed of engines, generators, motors or chain compound, and pumps can be located without regard to draw-works power. For a barge rig, this package can be housed in an engine room. For land rigs, it is not necessary to construct an expensive elevated substructure, nor to place the power group close to the derrick floor. This complete freedom of location promotes better arrangement of machinery and lowers cost.

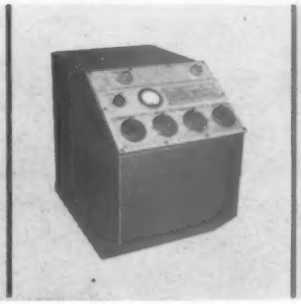
Get new *Drillectric* Bulletin 123 from leading rig manufacturers, White oil field representatives, or through White Diesel Engine Division.

Superior ENGINES ATLAS Imperial DIESEL ENGINES White DIESEL

White Diesel

WHITE DIESEL ENGINE DIVISION
THE WHITE MOTOR COMPANY
Plant and General Offices: Springfield, Ohio





Left, 500 HP motor for draw-works, rotary table or mud pumps. 1000 HP motors also available.

Center, small electrical panel easily fits ordinary drillers console.

Right, skid-mounted electrical control cabinet.

**Registered tradename.*

Fast help on corrosion control

–A big Texas natural gas plant required periodic analyses to determine whether MEA solution was breaking down in regeneration, forming corrosive salts. Samples were being sent out of state for analysis, "took forever" to get results. Enter Allied Chemical. Now tests are run in Dallas, results come back *fast*, help this plant prevent corrosion before it can start.

New plant start-up trouble quickly traced–Slug of distillate filled inlet scrubber, carried over to amine system. Aqueous amine solution thoroughly contaminated with hydrocarbon. Customer shut down plant, was going to dump entire charge. Allied Chemical specialists diagnosed trouble as too rich amine concentration, then suggested decanting solution into empty tanks, which saved half of charge.

Foaming in glycol plant–Customer wanted to know what caused it, how to stop it. Allied Chemical specialists flew to the site, deduced cause of the trouble in a matter of hours. Lab analysis confirmed their findings. In a recommendation just five typewritten lines long, they told customer how to solve the problem completely, economically.

USE GLYCOLS OR AMINES?

ALLIED CHEMICAL

technical service is ready–right now–to help you find straight answers to knotty problems

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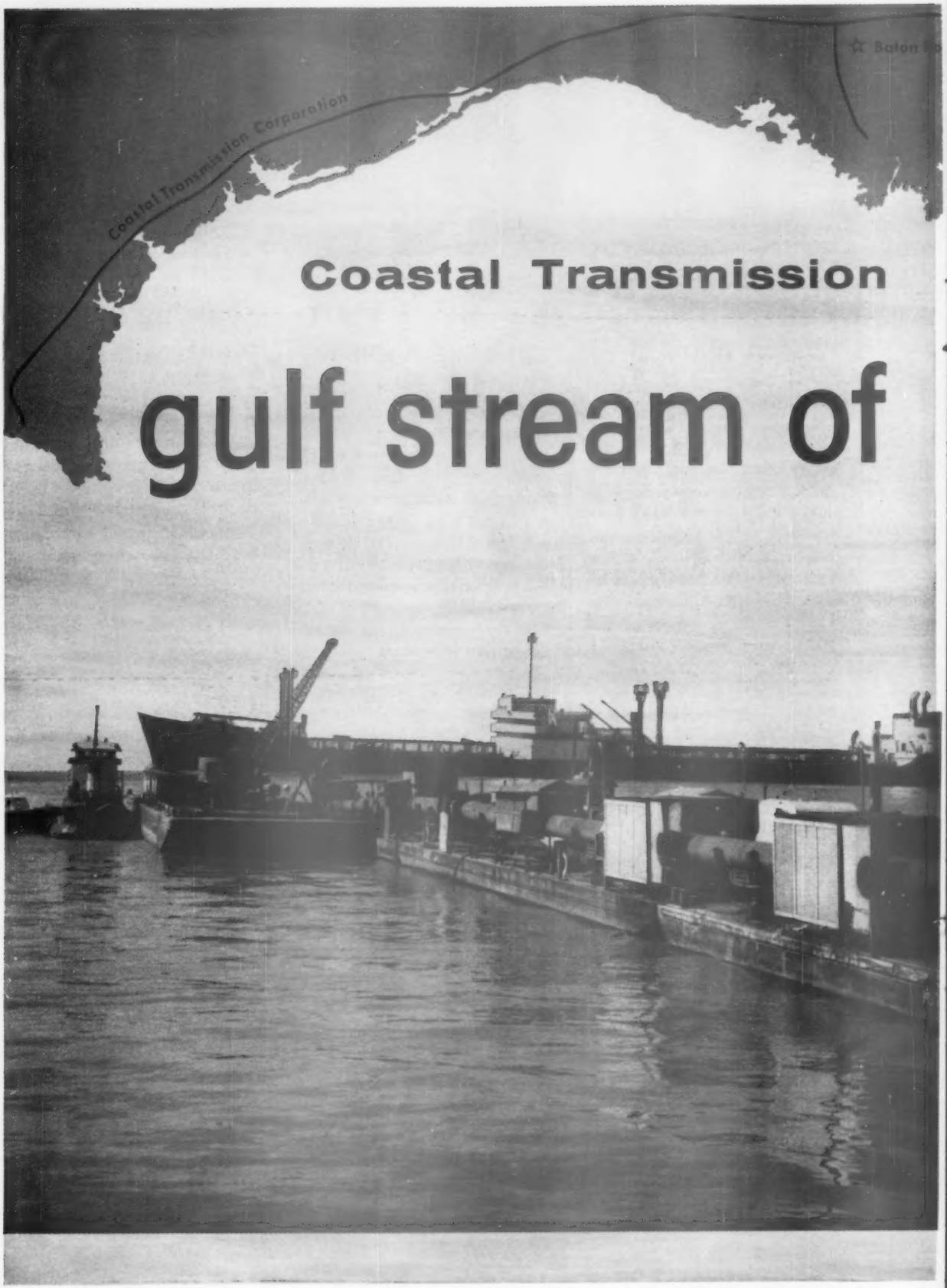
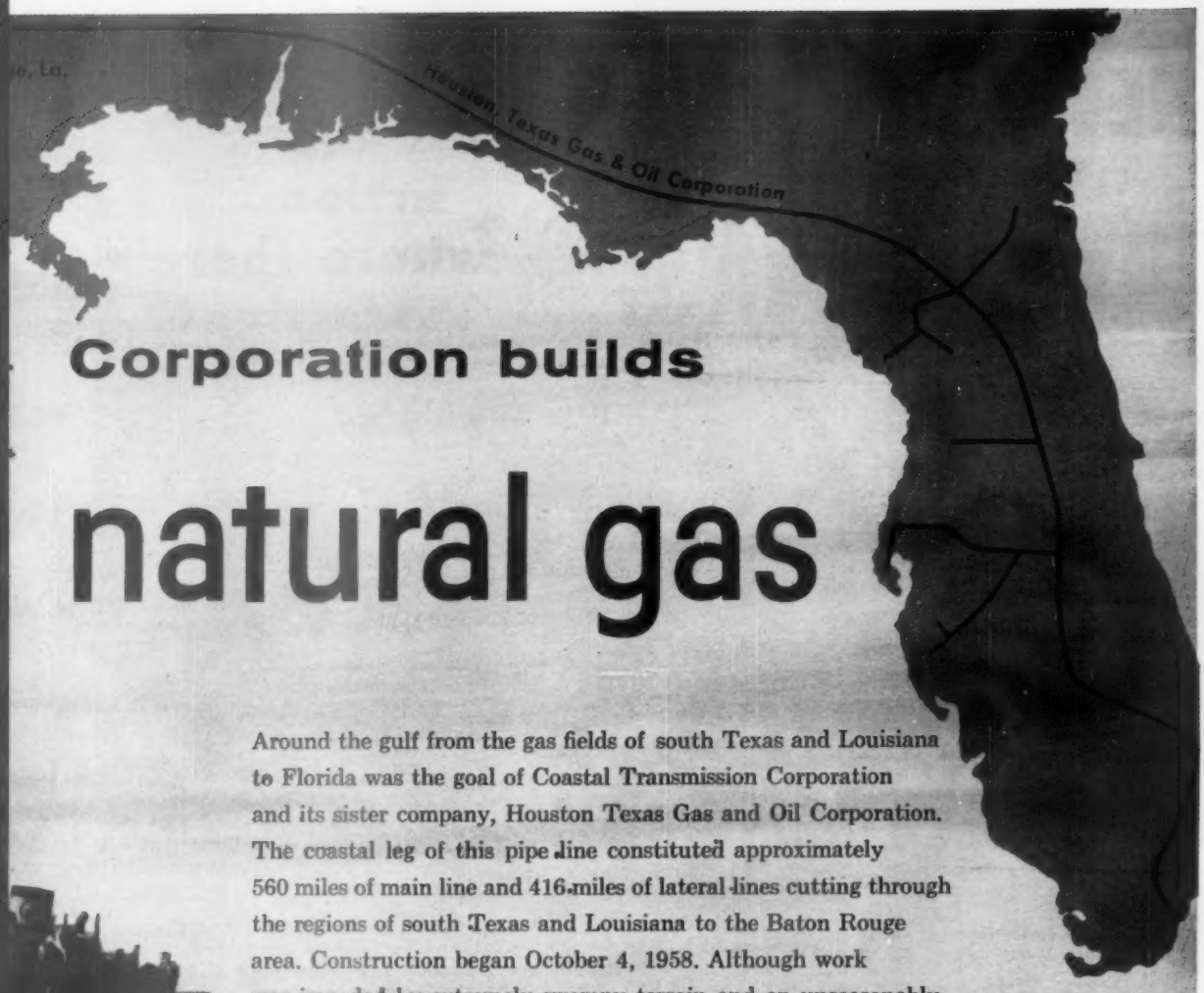

Coastal Transmission Corporation
Coastal Transmission
gulf stream of



Corporation builds

natural gas

Around the gulf from the gas fields of south Texas and Louisiana to Florida was the goal of Coastal Transmission Corporation and its sister company, Houston Texas Gas and Oil Corporation. The coastal leg of this pipe line constituted approximately 560 miles of main line and 416 miles of lateral lines cutting through the regions of south Texas and Louisiana to the Baton Rouge area. Construction began October 4, 1958. Although work was impeded by extremely swampy terrain and an unseasonably wet spring, the line was completed by June of 1959.

A. O. Smith furnished 167.5 miles of 24-inch pipe and 91 miles of 20-inch main line pipe that spans this coastal region.

For almost 30 years . . . A. O. Smith line pipe has always been manufactured to a high standard of quality . . . precisely controlled at every step of production. That's why A. O. Smith pipe, made and installed in 1928, is still in operation. That's why so much A. O. Smith pipe is found in every important pipe line project.

CROSSING THE BAY — Approximately 11 miles of 24-inch pipe was laid across Galveston Bay. Special techniques had to be employed in crossing the busy Houston Ship Channel. All of Coastal's river crossings were submerged.

Through research ... *a better way*

A.O.Smith
CORPORATION
TUBULAR PRODUCTS DIVISION
Milwaukee 1, Wisconsin

Chicago 4 • Dallas 35 • Houston 2 • Los Angeles 17 • Midland 5, Texas • New Orleans 12 • New York 17
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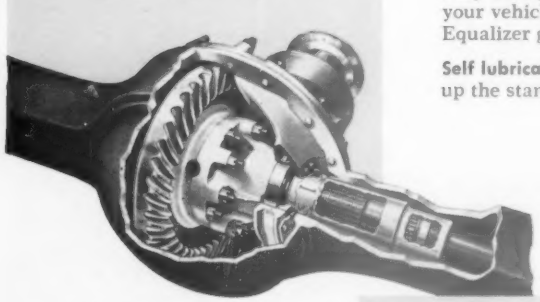
NEW ROCKWELL TRACTION EQUALIZER...

puts the action where there's traction!

Available with Timken-Detroit® Axles for safer, surer performance... on or off the highway!



Applies driving force to wheels with best traction. The Rockwell Traction Equalizer provides a substantial increase in tractive effort to the wheel with the best road adhesion. It is effective on a vehicle even if one pair of the driving wheels has *no* traction!

Safer, surer operation. A truck equipped with the Rockwell Traction Equalizer is easier to control on curves, slippery pavement and soft ground. The tendency of a vehicle to swerve when one wheel suddenly loses traction is eliminated because wheel spinning is reduced.

Constant actuation. The Rockwell Traction Equalizer doesn't depend on the driver to start it working. It is effective whenever one wheel has the tendency to turn faster than the other.

Tailored for effectiveness. With multi-drive axle vehicles, each axle may be equipped with Traction Equalizer units. No matter where your vehicles operate—on or off the highway—the Rockwell Traction Equalizer gives your vehicles better traction.

Self lubricating. The Rockwell Traction Equalizer automatically picks up the standard axle lubricant and works it through the unit.

Less maintenance. The Rockwell Traction Equalizer normally requires no maintenance between axle overhaul periods. It also cushions heavy impact loads upon tires, shafts and gears.

Another Product of... **ROCKWELL-STANDARD CORPORATION**

ROCKWELL R STANDARD®

Transmission and Axle Division, Detroit 32, Michigan

Shrinking Dollars

Mean Shrinking Profits

ALWAYS A FULL DOLLAR'S VALUE FROM AJAX

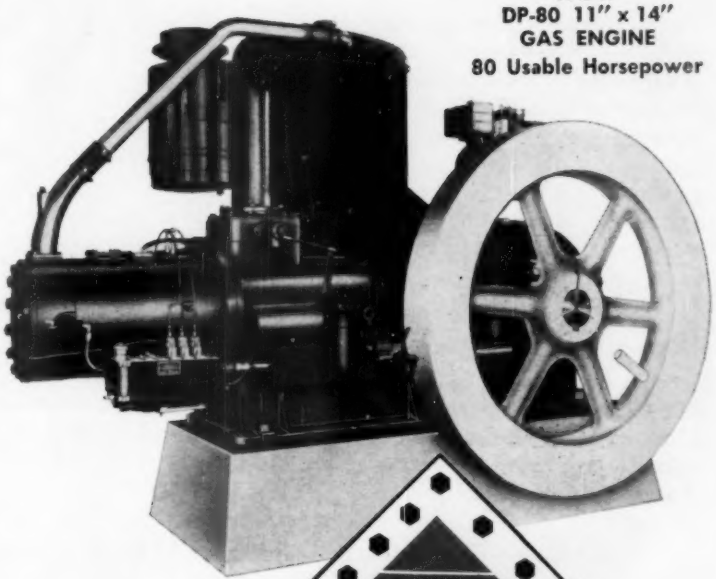
Equipment investment costs are more critical today than ever before.

Awareness of this fact is the reason for the addition to the famous craftsmanship quality line of Ajax Engines of this new intermediate 80 Usable horsepower unit.

With Ajax you don't have to buy more than you need in horsepower to still have a safety reserve and economical operation.

Simple but massive construction for easy low cost maintenance and long life — rugged special clutch for limited attendance — thermo-syphon cooling — are just a few of the full dollar value Ajax features . . .

Introducing the NEW DP-80 11" x 14" GAS ENGINE 80 Usable Horsepower



AJAX

AJAX GAS AND OIL ENGINES

AJAX IRON WORKS CORRY, PENNSYLVANIA

OIL FIELD DISTRIBUTORS: The National Supply Co., Pittsburgh, Pa.
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New Visco Well-Treating Formula Penetrates, Loosens, Disperses Deposits in Tanks, Lines, Tubing

Lowered pumping pressure, Tripled production, Dispersed solid paraffin... Among Spectacular Performance Results with Visco 1111

Visco 1111, on the job in oil and gas producing wells, water-injection wells and salt water disposal systems, has amazed even the most optimistic with its performance and economy. Here are a few examples of how it works to penetrate, loosen and disperse deposits of paraffinic-asphaltic compounds, carbonate scale, sodium salt deposits, iron compounds and other materials causing loss of production.

Cuts Pumping Pressure 175 psi

Injection pressure was 325 psi on a water injection well. Foreman believed pressure was due to a tight formation, but agreed to a test of Visco 1111. Pressure is down to 150 psi—and staying there, with one-gallon-per-day dosage of Visco 1111.

7-Well Cleanup Nets 60 bbl. Increase

Sticking pumps, caused by scale build-up, were causing frequent rod-pulling jobs on a 7-well East Texas lease. Visco 1111 cleaned up the pumps and tubing, upped production 60 bbl. per week. Company now using Visco 1111 on all their wells in East Texas.

Stopped Reperforating Need

On another East Texas lease, wells making high salt water with low-gravity oil tended to scale up and require periodic reperforation. Visco 1111 was given a trial on a well making only 3 bbl. oil and 20 bbl. water a day... quickly jumped daily production to 23 bbl. oil and 60 bbl. water. Cost: only $23.50 . . . as against $300 to reperforate.

Solid Foot of Paraffin Gone

A 500 bbl. tank contained 470 bbl. oil and a 12-inch paraffin bottom—so hard that an oil thief would not drop through. 5 gallons of Visco 1111 and 48 hours later the tank went on at 0.5% B.S. & W., *and no bottom at all.*

Easy to Use, Too!

Visco 1111 has excellent blending characteristics under a variety of field conditions, and does not gel when added to water. Your Visco Service Man will be glad to help you determine proper Visco 1111 dosages for best performance and economy on your leases. Ask him about this new well-treating product . . . or write us, today, for detailed product data.

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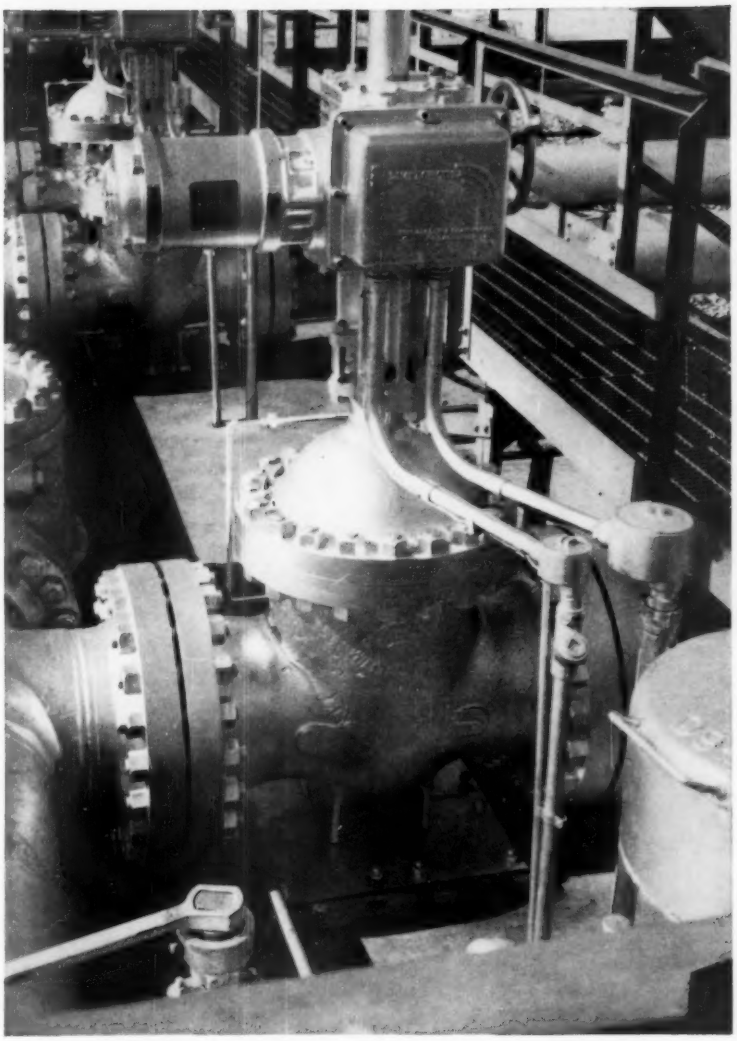
DARLING

DARLING

VALVES

How they cut down time in pipe line service . . .

with DARLING Revolving Disc GATE VALVES



Electrically operated 16" x 12" x 16" venturi-type Darling fully revolving double disc parallel seat *gate valves on a main line station.*

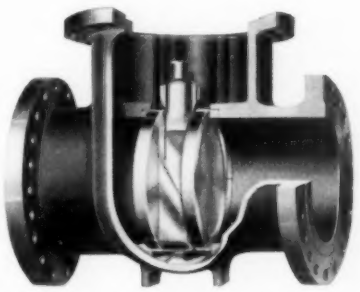
"What a difference!" . . . That's an expression often heard after Darling *fully revolving double disc parallel seat* gate valves go on the job.

In applications like this, these unique Darling valves show off their advantages well.

For example, Darling revolving disc gate valves successfully compensate for valve body distortion . . . they close tight every time! In addition, wear on discs and seats is *uniform.* These important parts just naturally last longer. After years of trouble-free operation should it become necessary to service the valves, the four working parts can be replaced on the spot . . . without removing the valves from the line.

GET ALL THE FACTS

Darling valve users are our best salesmen . . . we invite you to check with them. In the meantime let us send you a descriptive bulletin giving cost-saving facts. Just outline your specific service needs. State whether you are interested in main line, gathering, tank farm or other gas and oil line service. Darling valves can save you a lot of costly, time-wasting valve trouble in the future.



Cutaway showing complete simplicity of the Darling fully revolving double disc parallel seat *cast steel gate valve. Notice the four working parts . . . two interchangeable, no-pocket discs and two husky wedges. Maintenance is easy, assembly foolproof.*

DARLING VALVE & MANUFACTURING CO.

Williamsport 1, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ontario

TEX-TUBE Teamwork anticipates

Teamwork is the key to Tex-Tube's remarkable record in anticipating your needs for tubular goods. Teamwork between mill, warehouse and sales-service facilities.

Tex-Tube maintains large, well-balanced stockpiles of every description of steel tubular goods at Houston and other key locations in the South and Southwest.

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As for sales and service, Tex-Tube has earned the reputation of taking care of customers — even during shortages— and of *keeping its promises.* Fifteen years have built this reputation.

Let Tex-Tube's teamwork help *you.* You are invited to visit Tex-Tube's plant at your convenience.

TEX-TUBE, INC.

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Sales Offices in Midland, Texas—Tulsa, Oklahoma—
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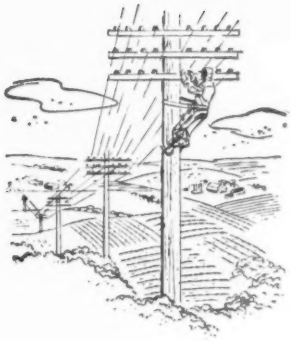
there's more to Cities Service than meets the eye!



Stretching from country to country, these wires hum with activity. Today there are over 70 million phones in use in the United States serving homes and industry. They are a vital part of our everyday life.

It takes 11,645 long distance and local operators to handle the phone calls for New York City. Approximately twenty million calls are made each day. To handle them it takes 16,896,346 miles of wires and cables just in New York City. But few of us think of all that's behind the phone calls we make.

Likewise, few of us think about all that's behind the gallons of gasolene we buy. But it takes thousands of miles of pipelines, a search of four continents for oil, refineries and research laboratories to bring gasolene to your Cities Service station.

Cities Service has already invested more than a billion dollars in product improvement. The challenge of tomorrow requires even greater investment.

Only in this way can America have what she needs for progress—more jobs and more and better oil products.

CITIES SERVICE

CITIES SERVICE COMPANY 50 ANNIVERSARY

The Biggest Bargain In The Oil Patch!

For a fraction of the cost of a casing string, you get an actual sample of formation fluid and a complete pressure record. With these, fact is positively separated from fiction. Doesn't it make good sense to know if your well will produce before setting casing?

Don't chance setting casing in a dry hole—don't chance abandoning what might be a prolific producer—DRILL STEM TEST to be positively certain.

Next time, and always, call Johnston. You get more from a Johnston Drill Stem test—more experience, the newest and most sensitive recording equipment, accurate evaluation and a complete test record. No other service costs so little for so much.

The improved Hydraulic Tester. Write for complete information.

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JOHNSTON DRILL STEM TESTING TESTERS

For extra high *strength wire rope...*

use **CF&I-Wickwire** *Double Gray*

The CF&I Image reflects CF&I's experience as a producer of many steel products and CF&I's versatility in developing new products to meet exacting requirements . . . like Wickwire Double Gray*.

The special steel used in Double Gray provides extra resistance to the deforming effects of peening and crushing which occur on the drums and sheaves of heavy equipment. Double Gray also gives extra resistance to abrasion.

Because of these superior qualities, Double Gray rope quickly repays its slightly higher initial cost in safer, more economical operations. Use it wherever extra high strength wire rope is required.

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**Wickwire Double Gray Wire Rope is made of extra-improved plow steel. Fortified by an independent wire rope core of the same extra high strength steel, Double Gray rope has a 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC.*

6632

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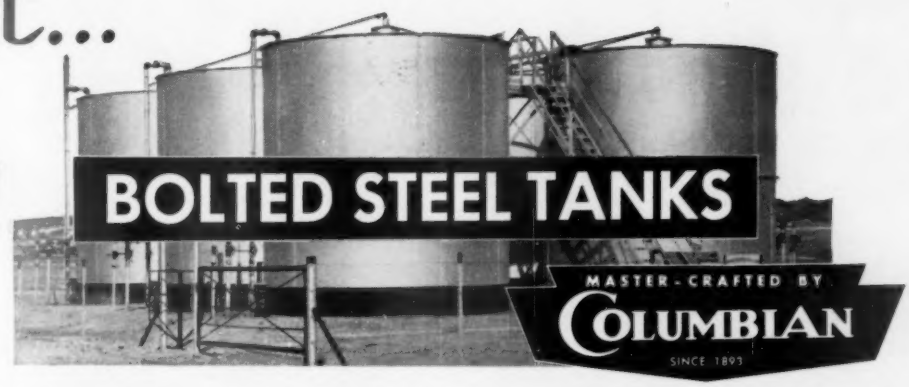
CF&I STEEL

First... to Last!



The first Columbian Bolted Steel Tanks (and they were the first built anywhere!) were built to last!

Today's Columbian Master-Crafted tanks are built to last, too — even better! They are everything that long-established, careful craftsmanship has always assured — *plus* all that modern research has developed to make them *set up* easier, *fit up* better, *stay tight* longer! You can save both time and money when you need a tank or tanks by getting in touch with your nearest Columbian distributor for the Bolted Steel Tanks that are *Master-Crafted!*

ORDER FROM YOUR NEAREST COLUMBIAN DISTRIBUTOR FOR FASTEST DELIVERY

COLORADO
O'Neill Tank Co.
STERLING
KANSAS
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GREAT BEND
HAYS
HILL CITY
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McClatchey Tank & Supply Co.
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and now...

COLUMBIAN Rigid Frame Steel Buildings

for greatest strength... most usable space!

Columbian Rigid Frame Steel Buildings are Master-crafted — and master-designed to provide maximum work or storage space inside. Whatever the width, length or height you plan, you get greatest unobstructed floor space and overhead clearance.

Use the structural economies and engineered strength of Columbian's basic steel structure for warehouse, field office, storage or tool shed, pump house, garage. Once up, you have a building that is fire-safe, strong and tight, requiring little maintenance, yet can be expanded or moved with ease.

FACTS FREE! Write us today for Steel Tank booklet and Steel Building folder.

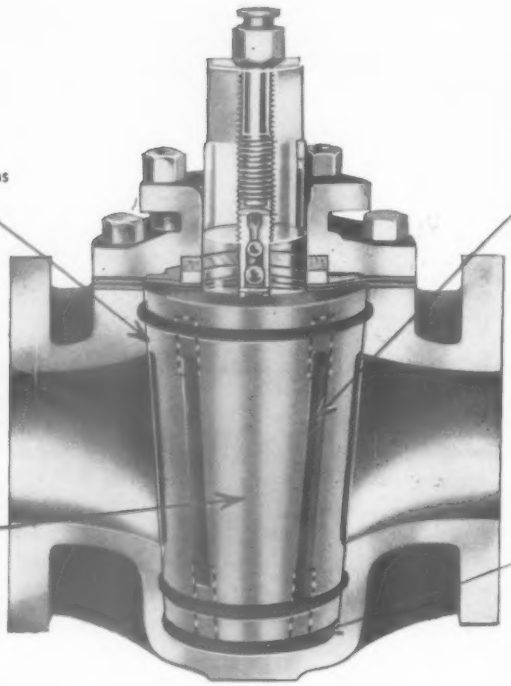
COLUMBIAN STEEL TANK CO.
P.O. Box 4048-J Kansas City, Mo.

TANKS FOR THE WORLD

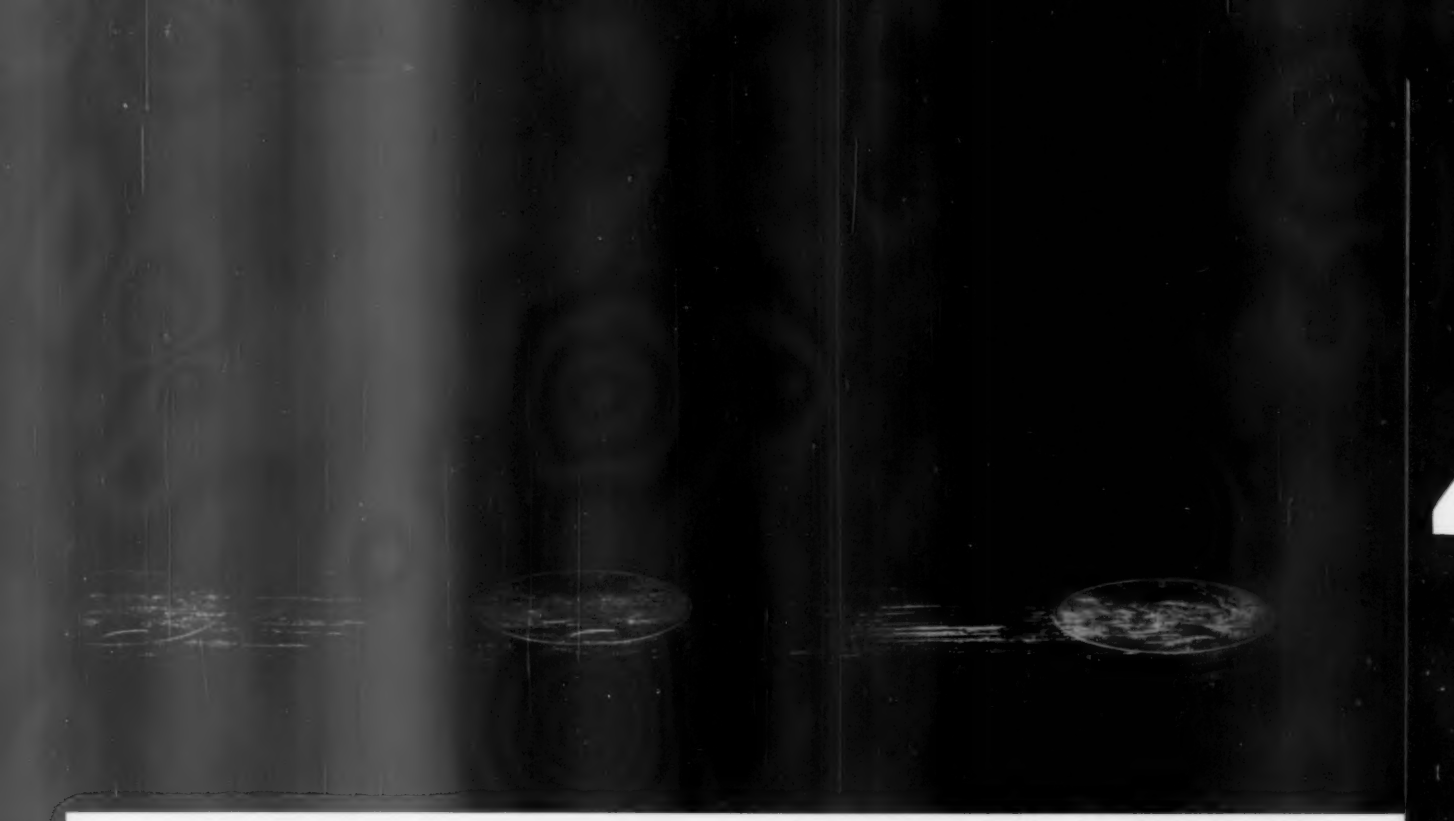
STEEL, Master-Crafted by Columbian... First for Lasting Strength

We do contract steel fabrication

Make valve dollars go


PROTECTED SEATS . . . between plug and body never exposed to line . . . plug "cleans itself" each time it's turned.
LEAKPROOF operation assured by pressurized lubricant seals between plug and body.
WEAR IS STOPPED by tough film of lubricant on all vital surfaces.
CAN'T GALL because lubricant hydraulically "jacks" plug keeping it free for instant operation.

Lubrication makes the



farther with

LUBRICONOMY

"Lubriconomy" is a streamlined way of saying that valve lubrication *is* economy . . . it saves money by eliminating wear.

Lubrication in Rockwell-Nordstrom valves will make your valve dollars go farther because it eliminates the wear of metal-to-metal friction on *every* moving part. Comparing these valves to other types is simply comparing a lubricated to a non-lubricated mechanism . . . which would you expect to work better, longer and at lower cost?

But lubrication in Rockwell-Nordstrom valves does more than eliminate wear—it assures extraordinary leak-proof control and dependability. *Pressurized* lubricant in the exclusive Sealdport® system creates a powerful double seal against leakage. (Much like a puncture-proof tire, pressurized lubricant sealing "heals itself" if cut, scratched or worn). And lubricant also hydraulically cushions the plug to keep it free for *instant*, quarter-turn operation.

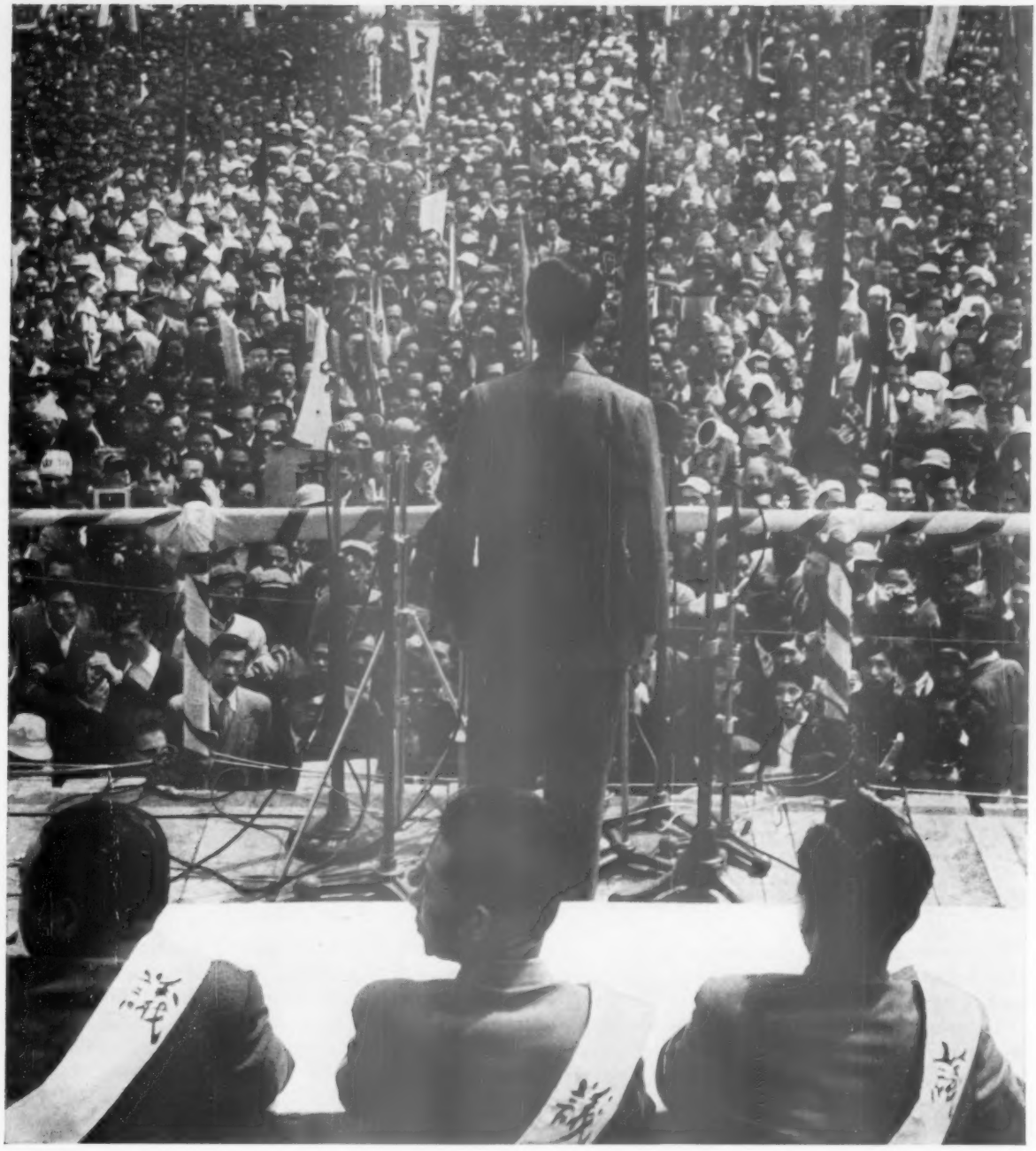
More than *6 million* Rockwell-Nordstrom valves are saving money today on every imaginable type of service. Why don't you try just *one* where you've had valve problems? Write for details, or have a Rockwell field engineer visit you. Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.

difference

ROCKWELL-Nordstrom VALVES

another fine product by

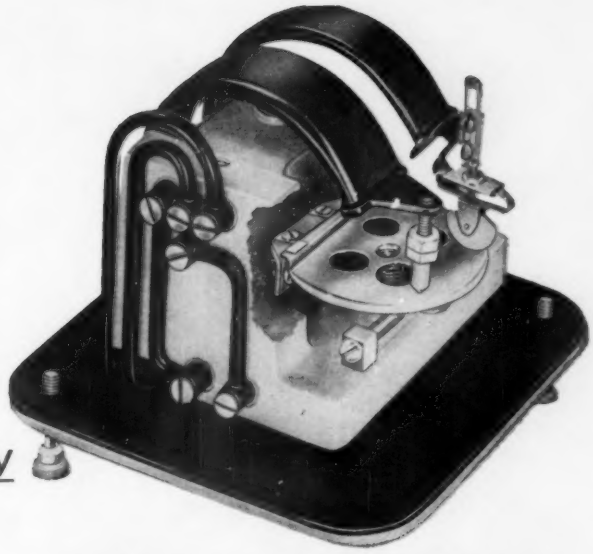
ROCKWELL



"The time when we could attend to our local affairs without reference to international events is long past. Such upheavals as the revolution in technology, the explosion of population, the awakening of Asia and Africa, will gather pace and power. The question is: are we capable of adapting ourselves to them? Here is the real contest between Communism and our own system. Which will be most responsive to the inexorable demands of the world as it is and as it will be?" —Eugene Holman, Chairman of the Board

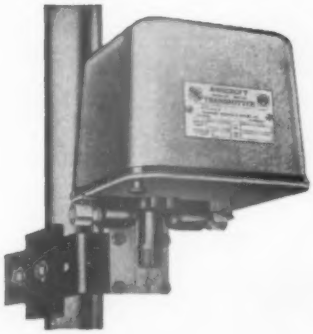
Standard Oil Company (New Jersey)

and affiliated companies



NEW high sensitivity ASHCROFT PNEUMATIC TRANSMITTERS

lower costs...reduce maintenance ...provide tighter control



Ashcroft Non-Indicating Pneumatic Transmitters are made in pressure and temperature types, each in regular and short span. Operation is on low-pressure air: output range, 3-15 psi or 3-27 psi.

These new transmitters are designed around (1) a powerful, efficient relay with sensitivity high enough to operate controllers, and (2) a simple, dual Bourdon tube motion-balance system. High sensitivity permits the use of narrowest proportional band settings on controllers and allows instant controller response to deviations from set point. With a shorter transmission lag, automatic corrective action starts before the deviation becomes critical.

In manual control systems, these new Ashcroft Transmitters (teamed with suitable receivers) make it practical to operate boilers at the most efficient level. In wet processing operations, fractionating columns yield a purer product. Highly suppressed Ashcroft Short Span Transmitters are so sensitive they can "judge" entire control loops and detect any errors in the system.

Basically a 6" cube, lighter than most 8½" pressure gauges, these climate-proof Ashcroft Transmitters are simple to install in cramped locations, are most readily accessible for adjusting or service. Calibration is extremely easy, with linearity checking entirely eliminated. Most parts in all types in the line are interchangeable. Ask your nearby Ashcroft Gauge Distributor about the lower initial costs and other savings that follow when you install Ashcroft Non-Indicating Pneumatic Transmitters. Send for Bulletin 361.

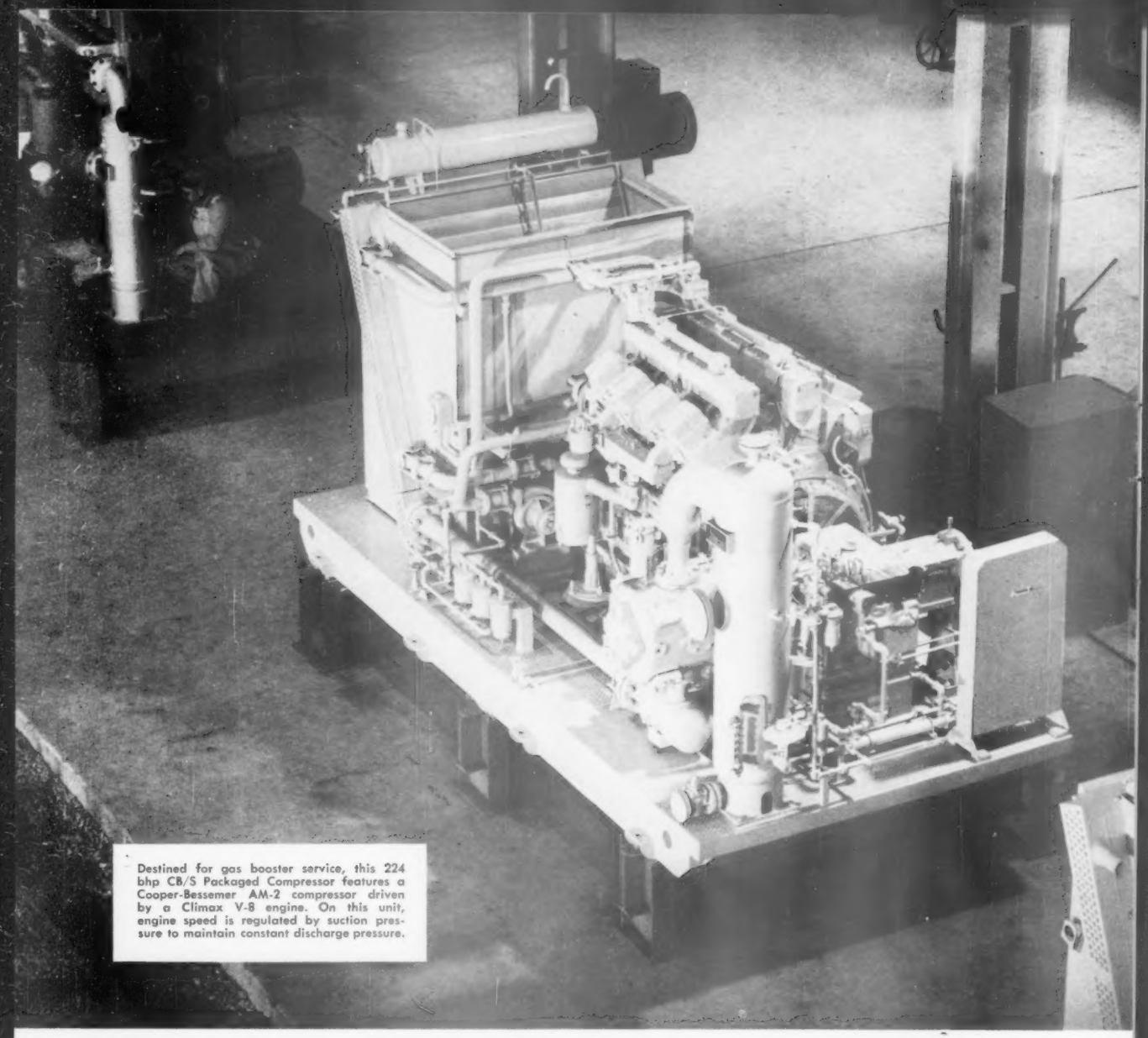
MAXWELL MANNING M&M & MOORE, INC. TRADE MARK

ASHCROFT PNEUMATIC TRANSMITTERS

A product of

MANNING, MAXWELL & MOORE, INC.

Consolidated Ashcroft Hancock Division • Stratford, Connecticut
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario



Destined for gas booster service, this 224 bhp CB/S Packaged Compressor features a Cooper-Bessemer AM-2 compressor driven by a Climax V-8 engine. On this unit, engine speed is regulated by suction pressure to maintain constant discharge pressure.

Building packaged compressors is our business . . . our only business. This single objective is the reason CB/S Packaged Compressors are more advanced in design . . . more efficient in the field.

CB/S
PACKAGED
COMPRESSORS

CB/S

C-B SOUTHERN, INC., P. O. BOX 19267, HOUSTON 24, TEXAS

A subsidiary of The Cooper-Bessemer Corporation.

See... WHAT Vogt CAN DO FOR YOU..

Bulletin E-1 shows Vogt's advanced designs in heat exchangers, reactors, oil chillers, crystallizers, pressure vessels, steam generators and ice making and refrigerating machinery for countless applications in petroleum refineries, chemical plants, power plants and related industries.

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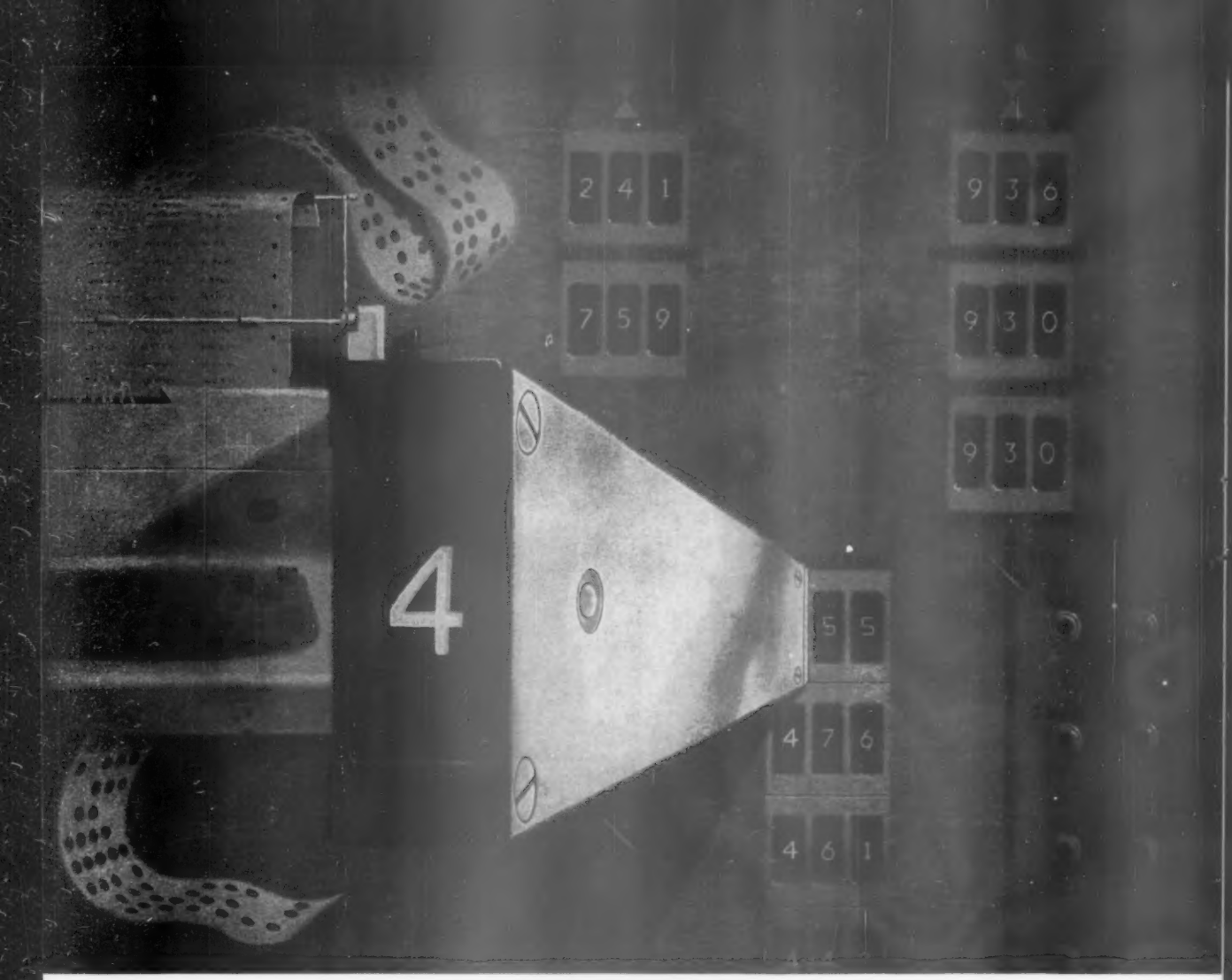

NEW CONTROL CONCEPT
can cut your pipeline costs

Did you ever try to solve a jigsaw puzzle without first looking at the total picture the puzzle makes? Pretty difficult—maybe even impossible. Best way, easiest way is to look at the big picture first, then see where the individual pieces fit.

It's the same with pipeline control.

First, look at your total system problem. Then, determine what sort of control system is required to safely, reliably and economically meet tomorrow's need as well as today's. That is Union Switch & Signal's approach to pipeline control.

Any part of a pipeline system. Union Switch & Signal can incorporate in a centralized control system any or all of the following functions: supervisory or remote control of satellite stations . . . telemetering of flow data from field back to your central dispatching office . . . automatic sequencing or control of equipment in the field . . . instrumentation . . . data handling and display . . . computing equipment . . . automatic integration of field data into your accounting operations . . . communications. Union Centralized Transport Control can be adapted to *any* problem from remote control of a single-unit booster station for gas or oil to automatic centralized control of an entire system from wellhead to ultimate consumer.

Error-free. Whatever the job assigned to it, Union Centralized Control operates completely free from error because it reduces to coded digital form all information and instructions transmitted to or from your central control office. As a result, you can transmit far more precise data than ever before; you can use the least expensive available communications service; and you never need to worry about lightning, noise or other interference causing a wrong or dangerous operation—this coded system automatically checks itself and responds *only* to correct and logical signals. It helps make your pipeline safer. It provides error-free *security* as well as reliability.

Lower operating cost. Most important, Union Centralized Transport Control cuts your operating costs, cuts the cost of future expansion, sometimes even cuts present installation cost of pumping stations.

Write for Bulletins PD 2006, PD 2007 and 1052

"Pioneers in Push-Button Science"

UNION SWITCH & SIGNAL
DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY
PITTSBURGH 18, PENNSYLVANIA

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In a variety of combinations, chemical plant and oil refinery equipment require alloy steels: Some components with stainless parts . . . some completely stainless . . . some with a number of other alloys, but all capable of specific customized functions.
Whatever your requirement for Specialty, Sun Ship is prepared to custom-construct pressure vessels, plate work, autoclaves and machinery . . . each to specifications and requirements . . . each made to order.
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ON THE DELAWARE • SINCE 1916 • CHESTER, PA.

Texas Waterflood Project

Bethlehem turnkeyed this waterflood project for a major oil company on a lease just south of Kermit, Texas. It was designed by Bethlehem with emphasis on simplicity and for the greatest possible economy of operation.

Four 125 hp triplex pumps, directly connected to two-cycle single cylinder gas engines, inject processed water at a rate of 20,000 BPD at 1,000 psi. Automatic controls maintain correct discharge pressure and tank levels, and provide adequate safety shut-down control for each pump-engine combination.

Bethlehem engineered, designed, and constructed the water injection station, the distribution system, and the metering facilities. The water treating facilities were Bethlehem-installed in conjunction with a leading engineering firm in the water treating industry.

Turnkeyed by Bethlehem

During the past decade, we have entered into turnkey and/or package agreements with many of the country's major and independent oil and gas producers. Working to their individual requirements, we assumed complete responsibility for the planning, design, and construction of waterflood projects which today are operating economically and paying large dividends. WE CAN DO THE SAME FOR YOU.

First, we survey the general mechanical requirements of the particular project with a close eye on costs and operating factors. We then work out the machinery and other equipment necessary to the successful procurement of raw water, its treatment, distribution, metering, and injection. With turnkey contract, we engineer the entire job. We select and install the proper pumps, drives, controls, piping, tanks, shelters, and other items required for the project. When the complete installation checks out satisfactorily, we turn the fully operating plant over to the customer.

Let us tell you more about Bethlehem turnkey and package services. Simply use the coupon below.

BETHLEHEM STEEL COMPANY, Supply Division
Sales Department,
Box 2171
Tulsa 2, Oklahoma

Please send me your new descriptive Booklet 1655: "*Bethlehem Waterflooding Services.*"

Name & Title_____

Company_____

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BETHLEHEM STEEL COMPANY
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Canadian Distributor: Bethlehem Supply Company of Canada, Ltd., Calgary, Alberta, Canada

BETHLEHEM STEEL

BETHLEHEM STEEL

SUPPLY DIVISION

First diesel engine is driven ashore at El Palito by a truck that accompanied the shipment from Newport News.

KELLOGG PROCUREMENT

CUTS REFINERY COSTS

WITH LANDING CRAFT

When faced with the problem of getting four huge diesel engines from the United States to Venezuela, and installing them for generating power in a remote coastal refinery, Kellogg minimized man-hours for shipment and installation by chartering a landing craft.

Customary dismantling, crating, and reassembling were avoided; engines were landed almost at the power plant site; the entire job completed within just ten days after the craft had left Newport News, Virginia.

This unique procurement operation, part of Kellogg's complete turnkey responsibility for Mobil Oil Company de Venezuela's new 50,000 BPD refinery at El Palito, is typical of the cost-cutting ingenuity that goes into every phase of Kellogg's coordinated procurement-engineering-construction services for oil companies throughout the world.

Refinery engineers interested in the details of Kellogg's complete assignment at El Palito are invited to send for the current Kelloggram—"Operation Procurement", and a recent folder on the entire project—written in Spanish and English.

Weighing 100 tons each, the first of four diesel engines is hoisted aboard landing craft at Newport News, Virginia.

THE M. W. KELLOGG COMPANY

711 Third Avenue, New York 17, N. Y. *A Subsidiary of Pullman Incorporated*

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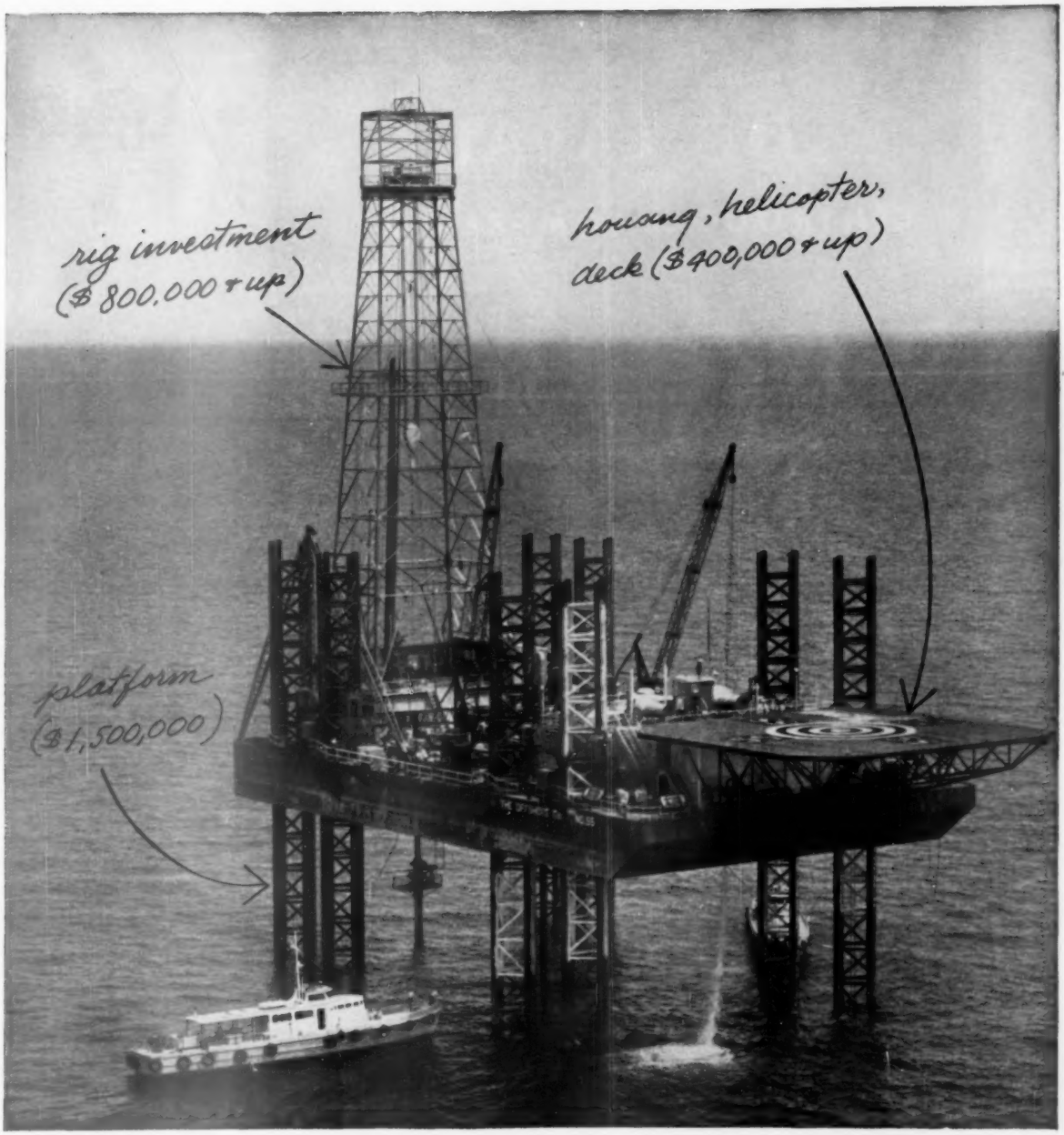
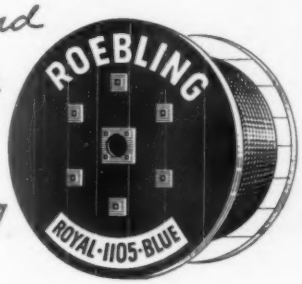


When you spend $4,000,000 for an offshore rig you can't afford not to use the best rope



You wouldn't use Bargain Basement bits. You'd get the best. You'd get the best of everything; that's why an offshore rig can run as much as $4,000,000.

To settle for anything less than Royal Blue at this stage would, indeed, be "pound foolish." For Roebling Royal Blue Wire Rope represents in *its* field, the finest there is.

It is made from the toughest rope wire ever produced—Type 1105—extra high-strength improved plow steel. Royal Blue has all the hard-working advantages of preformed construction; outstanding resistance to abrasion, fatigue, impact, crushing and shock; exceptional flexibility and ruggedness. Collectively, these values add up to 15% more strength than in any other rope you have ever used.

Anything less than Royal Blue can cost you *more*. Your distributor has Royal Blue right now. Get it now and save and save and save. For information on Royal Blue, write Roebling's Wire Rope Division, Trenton 2, N. J.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

DE LAVAL

CENTRIFUGAL COMPRESSORS

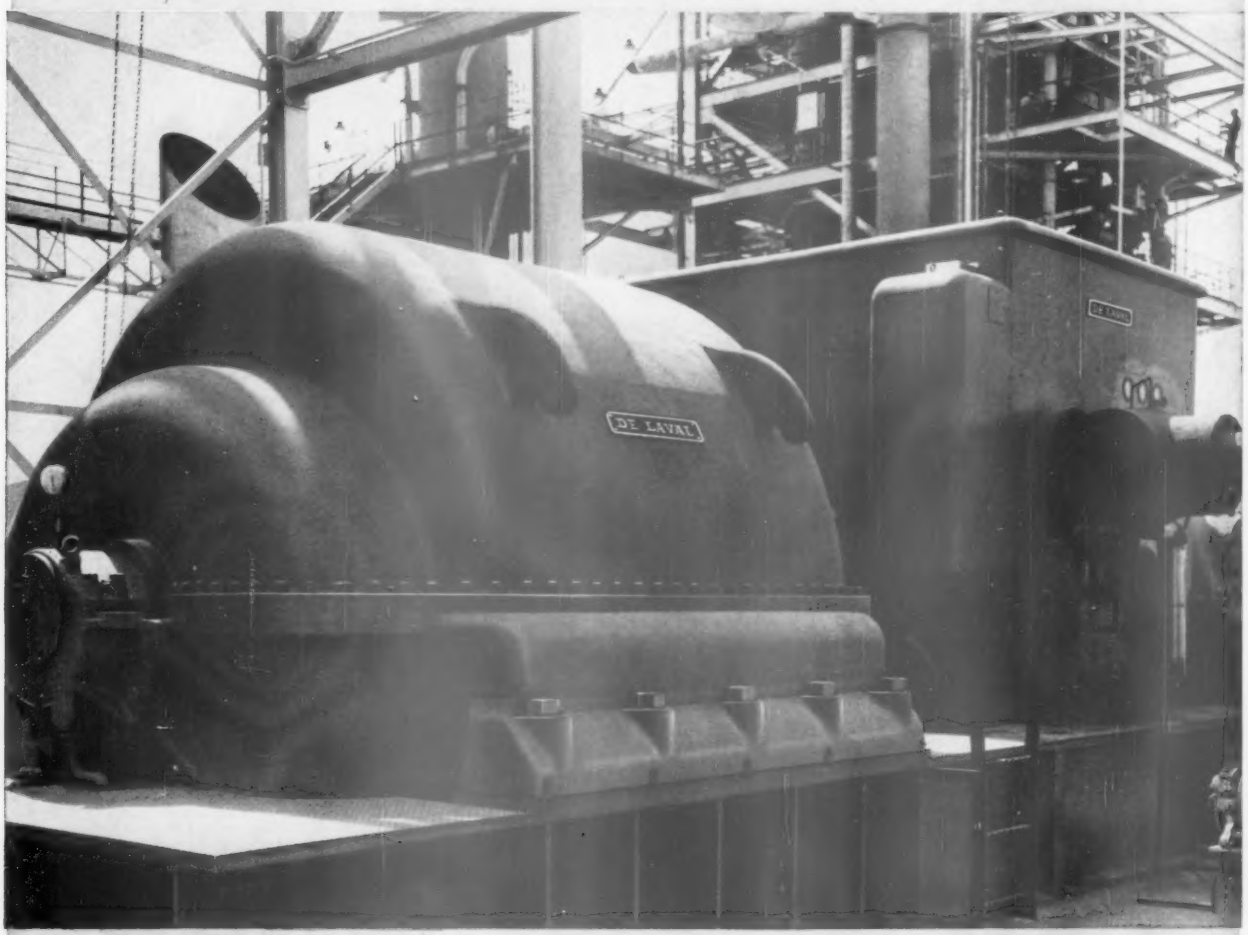
11,300

Driven by automatic extraction steam turbine

Shown below is the large 11,300 horsepower centrifugal blower which compresses air for the main blower service in catalyst regeneration at Standard Oil of Ohio's new refinery at Toledo, Ohio.

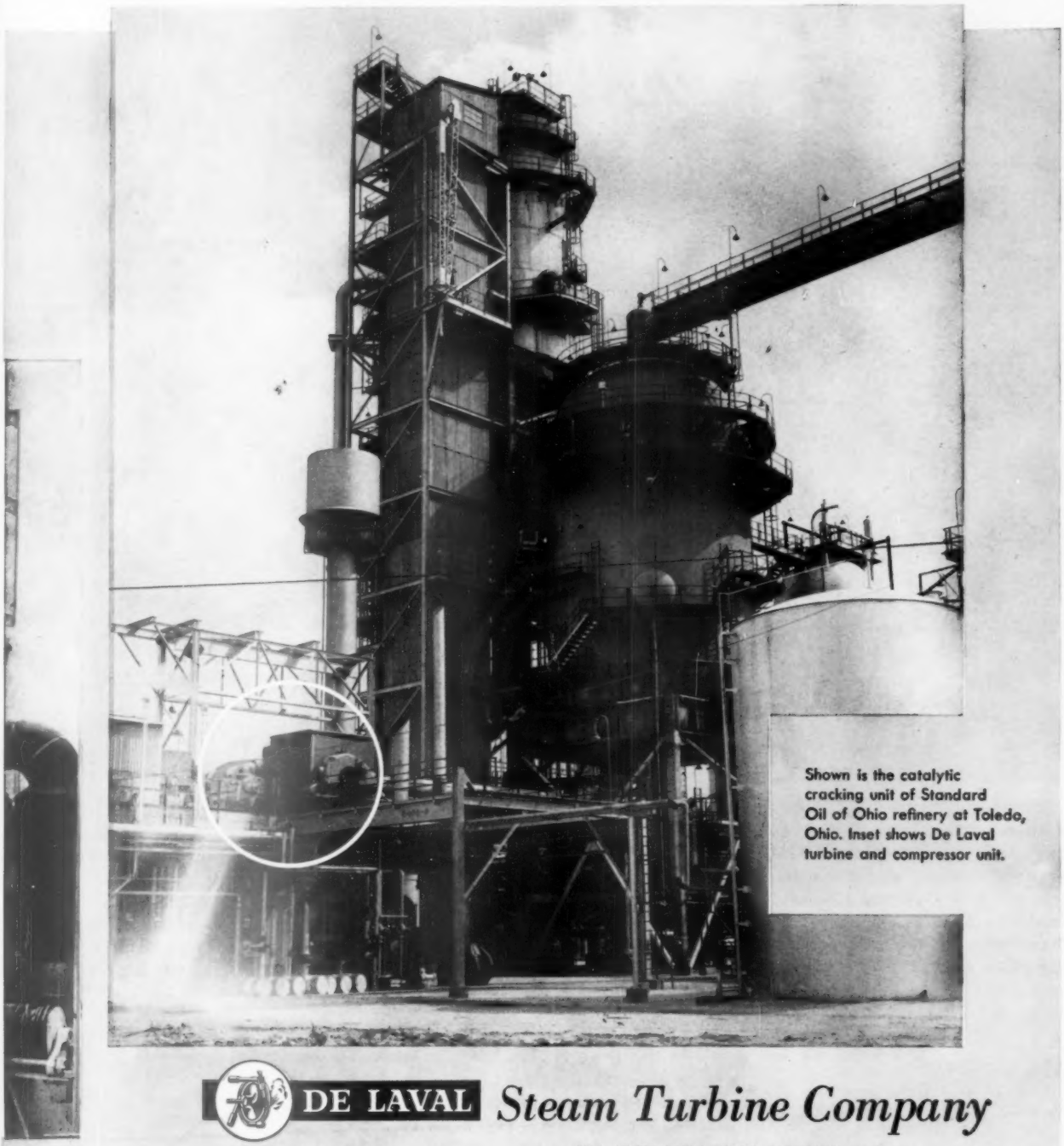
Driven by a De Laval single automatic extraction steam turbine, it compresses 110,300 cfm in four stages at 2800 rpm. Inlet pressure is 14.7 psia and discharge pressure is 40.7 psia. The turbine is designed for 600 psig ISP, 740F extracting at 55 psig, and exhausting to 28" Hg.

This is another example of De Laval proved performance.



DL-437

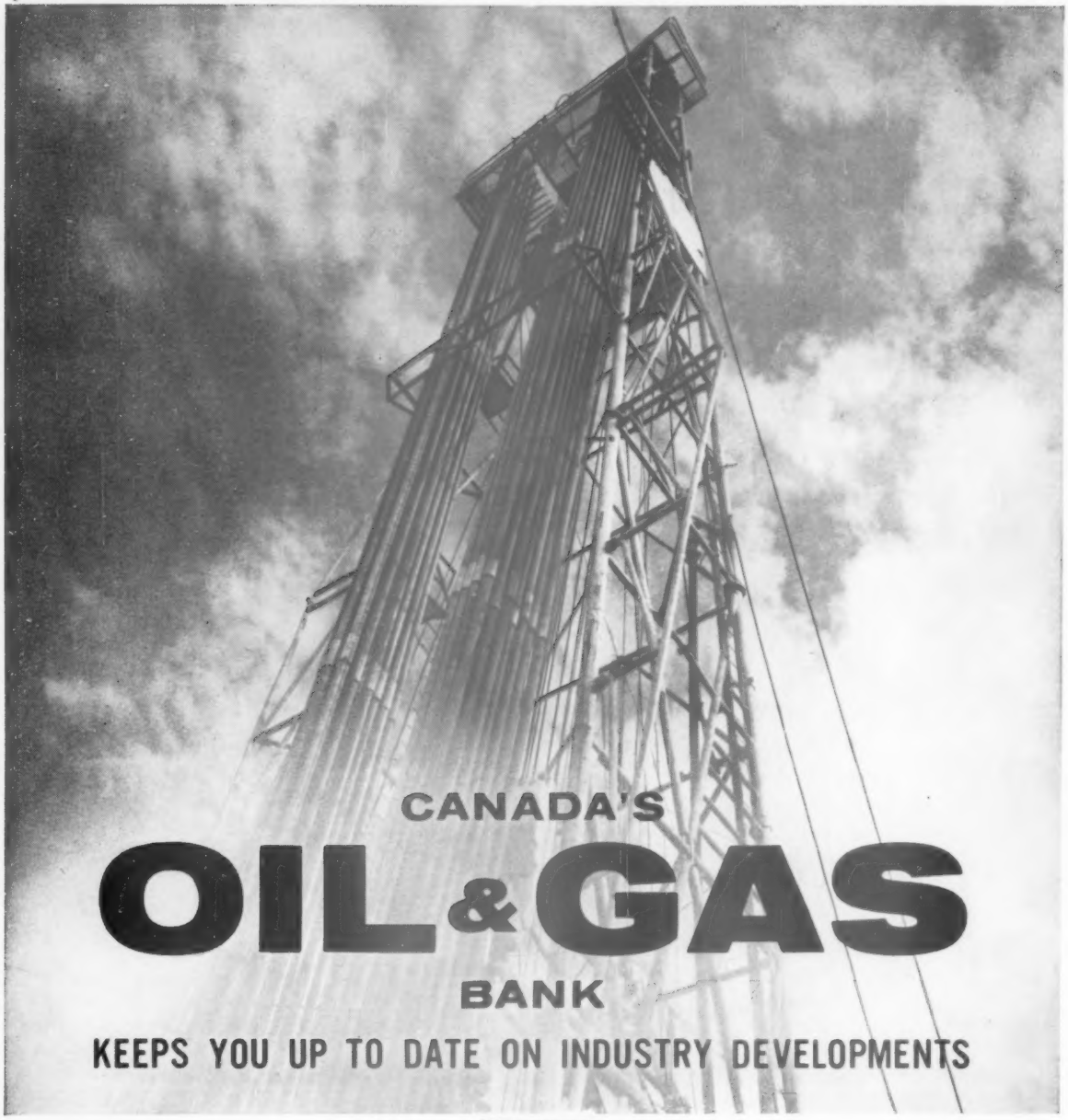
horsepower DE LAVAL compressor for "cat cracker" at SOHIO refinery



Shown is the catalytic cracking unit of Standard Oil of Ohio refinery at Toledo, Ohio. Inset shows De Laval turbine and compressor unit.

DE LAVAL *Steam Turbine Company*

810 NOTTINGHAM WAY, TRENTON 2, N. J.



Whatever phase of Canada's oil and gas industry may interest you, the "Royal" is well equipped to serve your banking needs through more than 300 branches in the oil- and gas-producing Western provinces. In addition, a special Oil and Gas Department at Calgary stands ready to provide you with current information and practical assistance.

The Special Bulletin Service of this department is highly valued both by those already established in the industry and those planning to enter it. A list of these Bulletins, dealing with regulations, tariffs, financing, statistics, and related matters is available on request. Write The Royal Bank of Canada, Oil and Gas Department, 409 Eighth Ave. W., Calgary, Alta.

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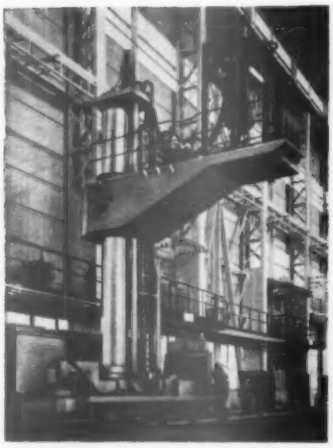
Total Assets Exceed 4 Billion Dollars

"WORLD WIDE" FABRICATOR OF PROCESS EQUIPMENT

CHIYODA CHEMICAL ENGINEERING & CONSTRUCTION CO., LTD., Japan's most experienced and leading fabricator of process equipment such as heat exchangers, coolers and condensers, has been serving the petroleum and chemical industries of the world for many years. Chiyoda has been receiving inquiries from American oil refining companies and contractors and has exported heat exchangers, vessels and towers to several major projects in construction. Repeat orders are being welcomed, which is evidence of Chiyoda's expert workmanship, early delivery and competitive prices.

At our Kawasaki factory, extra thick plates of large diameters and lengths for higher temperature and pressure services, are worked in accordance with ASME, ASTM or other standards.

Modern equipment and advanced techniques are combined to assure you the best in quality and precision....right on schedule....at costs which guarantee you the most for every dollar spent.



Unionmelt Welding Machine

Equipment fabricated and exported:

- Heat exchangers
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- Distillation columns
- Fractionating towers
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- Heaters
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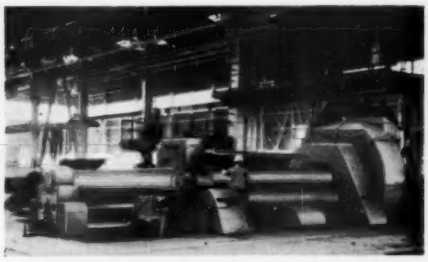
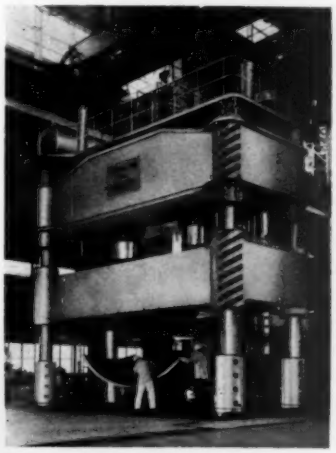


4 Rolls Bending Roller



1,500-ton Hydraulic Press

CHIYODA

"Process Plants & Equipment Specialists"

CHEMICAL ENGINEERING & CONSTRUCTION CO., LTD.

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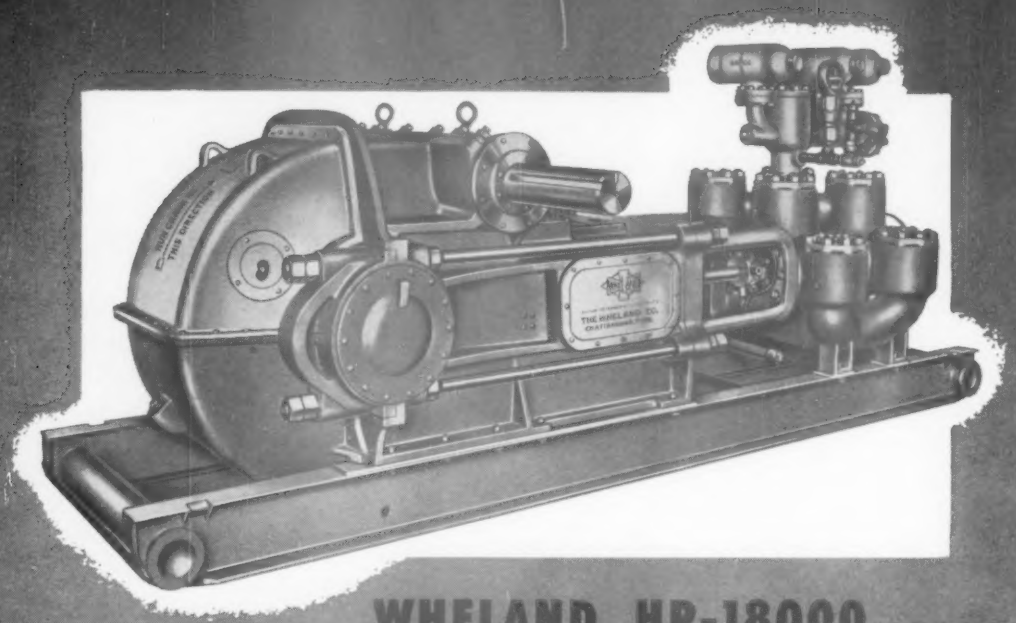

WHELAND HP-18000
DUPLEX POWER SLUSH PUMP
7¾"x18" 750 HP NOMINAL INPUT at 60 RPM

WHAT IS THE *OPTIMUM* PUMP FOR YOUR JOB?

You consider the pressure and volume needed, the weight and cost of moving the pump, the cost of power to drive it and your initial investment.

More and more men who know how to use big pumps are coming to the studied practical conclusion that a 600 to 750 hp input pump is **OPTIMUM** for their operations.

The Wheland HP-18000 pump gives you up to 826 gpm and 1,322 psi with 7¾" liners and up to 388 gpm and 2,700 psi with 5½" liners. It weighs only 36,377 lbs., is easily moved in one piece, is rated at 750 hp at 60 rpm, has six big features combined on no other pump and a top record for performance and dependability.

Detailed bulletin sent on request.

It will pay you to see if this isn't the *OPTIMUM* pump for your job, too!

WHELAND
ROTARY DRILLING MACHINERY

THE WHELAND COMPANY
CHATTANOOGA, TENNESSEE, U.S.A.

DRAW WORKS • SLUSH PUMPS • ROTARIES
CROWN BLOCKS • TRAVELING BLOCKS • SWIVELS

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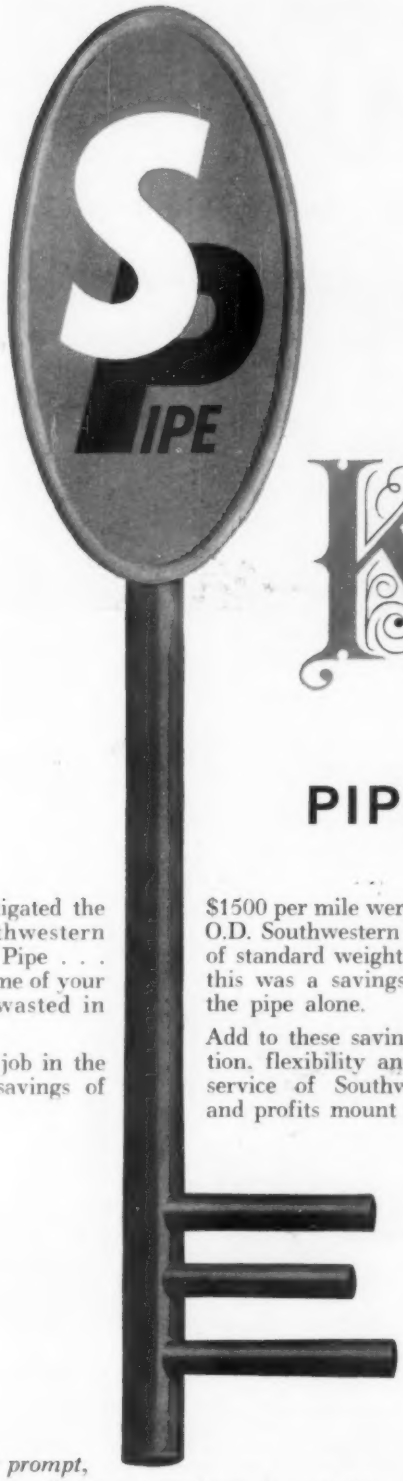
EXPORT DISTRIBUTORS: LUCEY EXPORT CORPORATION—233 Broadway, New York 7, New York—Broad Street House, London, E. C. 2, England.



KEY to PIPELINE PROFITS

If you haven't investigated the advantages of Southwestern LIGHTWALL Line Pipe . . . it's a good bet that some of your potential profit is wasted in pipe cost.

On a recent 35-mile job in the mid-continent area savings of $1500 per mile were made by using 4.500" O.D. Southwestern LIGHTWALL instead of standard weight of the same size—and this was a savings on the initial cost of the pipe alone.

Add to these savings the ease of installation, flexibility and the long trouble-free service of Southwestern LIGHTWALL and profits mount still further.

You can depend on our prompt, reliable deliveries . . . usually from warehouse inventories.

SOUTHWESTERN PIPE, INC.*

**Corporate name changed from Southern Sales & Transportation Co. May 1st, 1959*

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LICENSED BY THE AMERICAN PETROLEUM INSTITUTE

PUMPAGE

Goulds' news about pumps for process industries

Idea from a cosmetic bottle

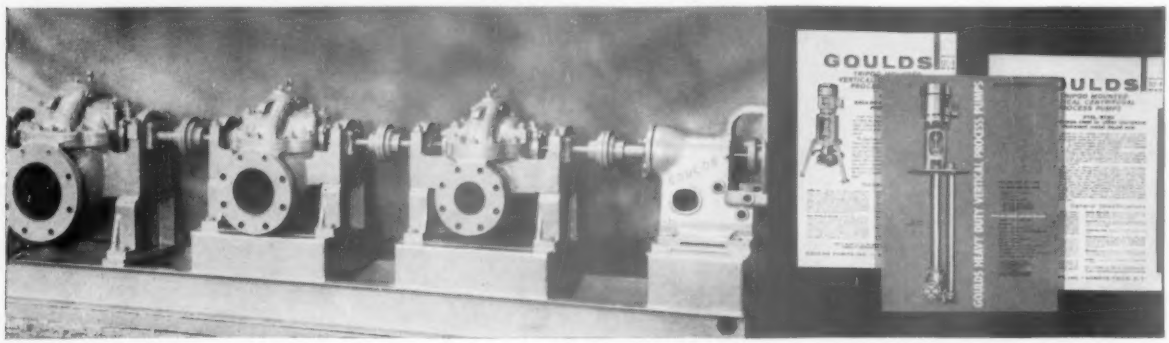
Cold wave lotion made from Evans Chemetics' thioglycolic acid comes to consumers in a bottle. A *glass* bottle. That set Evans to thinking: if *glass* prevents contamination in packaging, why can't it do the same job in *processing*? So they installed a Goulds-Pfaudler *glassed* pump. In it, glass is permanently fused to metal at every surface that contacts the pumpage. Result? Where expensive alloys were required to prevent contamination during processing, now smooth *glass* does the job . . . *better!* Maintenance and replacement problems ended too—for a full year after installation! Write for Bulletin 725.2.

Largest and smallest

The man dwarfed by the giant pump is a Goulds Application Engineer. Look closer. He's holding another pump, small enough and light enough to be held in one hand! His assignment: select the right pump for *your* specific need from all the pumps that fall within the range of Goulds' largest and smallest pumps. For instance—want to move a *lot* of liquid *fast?* That big job does it at *40,000 GPM!* Need a small, stainless steel pump that you can use 24 hours a day for chemical circulating or transfer work? Get as little as 1 GPM with the little pump. Cut pumping costs with the *right* pump for your job.

Pump with a built-in "steam bath"

When fat is a problem—try a steam bath! The steam bath we're speaking of keeps fats, wax, paraffin and other low-melting point solids *fluid* in your pumping system. It's "built-in" on the Goulds Fig. 3715 chemical pump to maintain high process temperatures—right at the pump. A steel steam jacket of full casing diameter keeps *all* the liquid in the pump hot. Can be furnished with new, or added to existing, pumps. You pump low melting point fluids or saturated salt solutions without "freezing"—to reduce down time in your operation. Write for Bulletin 725D17.



Tandem-mounted pump idea

Here's where it might pay you to put all your eggs in a single basket! One oil refiner set up four Goulds pumps *in tandem*, powered the whole works with one steam turbine. Advantages? The combined total horsepower allowed selection of a more efficient large turbine with reduced steam consumption—plus eliminating 3 turbines, bases and foundations. The two Goulds Fig. 3405 pumps in the center handle rich oil at 300 and 375 GPM respectively, with heads of 211 feet. At the left is a Goulds Fig. 3405 that pumps 600 GPM of lean oil at 248 ft. head. Pump on the right is a Fig. 3755 for supplying still reflux at 155 GPM and a head of 149 feet. All pumps and the turbine are mounted on a common steel base.

News about vertical process pumps!

Here's a complete rundown on what's new with heavy-duty vertical process pumps for handling corrosive liquids in the chemical process and allied industries. In many applications in the process field, the use of vertical pumps for transfer or other services offers many advantages. Advanced design provides for wet pit, dry pit and tripod-mounted pumps with maximum interchangeability of parts. These booklets list them all—and they're yours *free*. Just send to Goulds for your copy. Write Goulds Pumps, Inc., Dept. OG-10, Seneca Falls, New York.

GOULDS GP **PUMPS**

LARGE MID-WESTERN REFINERY uses well over 200 LimiTorque VALVE CONTROLS

. . . on Platinum Catalyst Reforming Units

The above illustration shows a LimiTorque Motorized Valve Control mounted on a 12", 600 lb. valve on a platinum catalyst reforming unit . . . This is just one installation of well over 200 such units used in this modern, well known refinery, and is but one of many thousands of LimiTorque controls used throughout the refinery field in America and foreign countries.

These LimiTorque units are of explosion-proof design having motors with Underwriters Labels . . . They are also equipped with position indicators which transmit valve position back to the control point.

There is no guesswork or labor connected with the LimiTorque Valve Controls . . . from a conveniently located control point, one key man can open and close any type of valve quickly and dependably in remote or hazardous locations.

LimiTorque may be actuated by any available power source, such as Electricity, Oil, Gas, Water or Air; and is available for Microwave control.

Send for Catalog L-550 for details.

THERE IS NO SUBSTITUTE FOR

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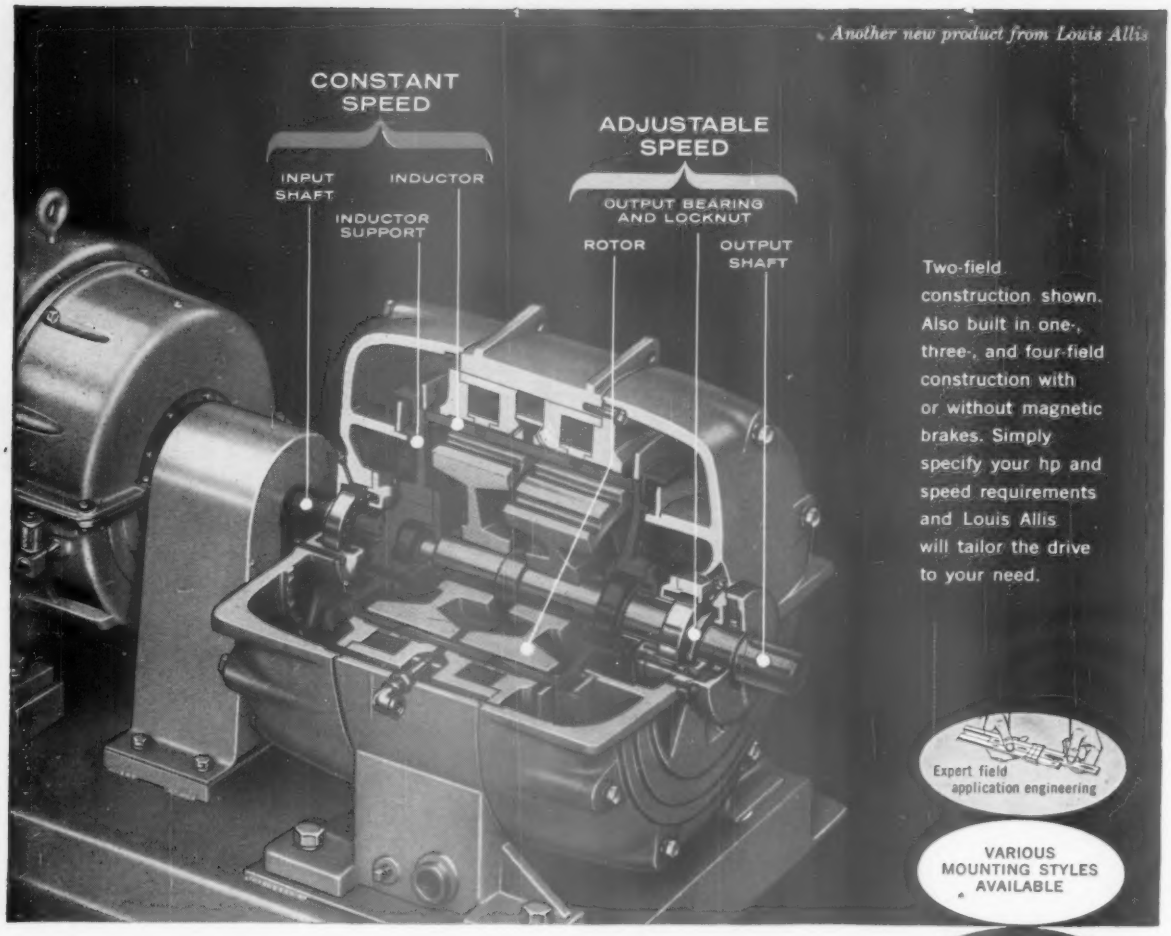

Another new product from Louis Allis
CONSTANT SPEED
ADJUSTABLE SPEED
INPUT SHAFT
INDUCTOR
INDUCTOR SUPPORT
OUTPUT BEARING AND LOCKNUT
ROTOR
OUTPUT SHAFT
Two-field construction shown. Also built in one-, three-, and four-field construction with or without magnetic brakes. Simply specify your hp and speed requirements and Louis Allis will tailor the drive to your need.
Expert field application engineering
VARIOUS MOUNTING STYLES AVAILABLE

The new Louis Allis MAGNETIC DRIVE

A compact, adjustable speed drive up to 2000 hp!

Based on a liquid-cooled magnetic coupling design, the *all-new* Louis Allis Magnetic Drive offers you the finest in precise regulation, compactness, and design flexibility for adjustable speed drives up to 2000 hp.

A unique annular cooling manifold provides effective heat transfer. It eliminates "water-drag" since there is *no* liquid in the air gap between the constant-speed and adjustable-speed members. There's no "flooding" the Magnetic Drive or forcing of water into bearings. And you'll *never* find condensation in the bearings. The reason: a planned flow of air through the drive reduces bearing temperatures and exhausts any condensation which might occur as the unit cools off after use.

Stationary field construction eliminates slip rings. All bearings can be lubricated without disassembly, and grease chambers provide ample grease reservoirs. Coils and lead connections are encapsulated in a chemical- and heat-resistant polyester — and simplified construction eases inspection and servicing. The *all-new* design permits simple relocation of cooling inlet, conduit box, discharge, etc., regardless of direction of rotation.

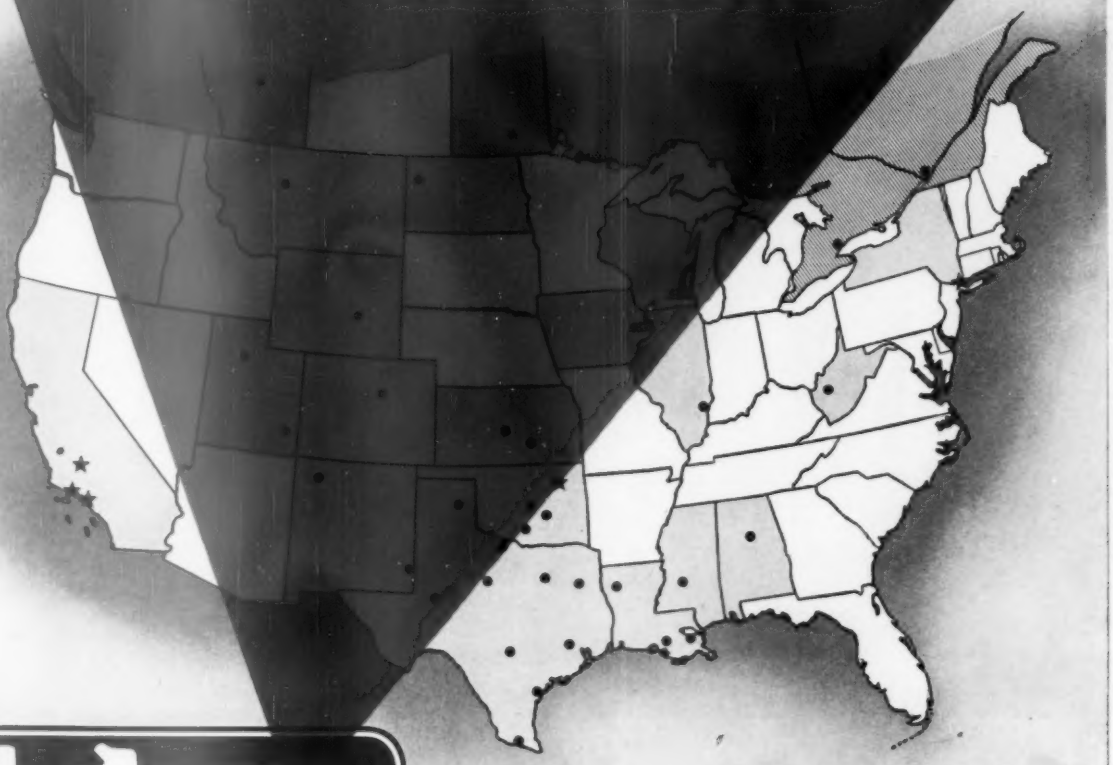
If your plans call for adjustable speed drives — specify Louis Allis Adjustable Speed Magnetic Drive. Write for a copy of Bulletin 3650 — now available at your Louis Allis District Office, or from The Louis Allis Co., 449 E. Stewart Street, Milwaukee 1, Wisconsin.

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

WHEREVER THERE'S **OIL**

THERE'S **WAUKESHA** SERVICE



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POWER UNITS · GENUINE PARTS · COMPLETE SERVICE

You can and do get service on Waukesha Oil Field Engines —when you want it, where you want it, how you want it. There's a Waukesha Oil Field Distributor, or one of his branches, near you. He has the set-up to give you top-notch service—experienced engineers and specially trained service men. And the genuine Waukesha parts you'll need, too. Look for the sign—stop in and see him.

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THE LOVE MACHINE CO., Inc.
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460

WAUKESHA MOTOR COMPANY — **WAUKESHA, WISCONSIN ★ New York ★ Tulsa ★ Los Angeles**

Factories: Waukesha, Wisconsin, and Clinton, Iowa

This is Why the Nash is the Most Simple Compressor

It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods Data on these pumps sent immediately on request

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

NASH ENGINEERING COMPANY
313 WILSON, SO. NORWALK, CONN.

An important message for the man who buys

SEAMLESS STEEL PIPE

Produced in accordance with A.P.I., A.S.T.M. and many other international standards, Sumitomo pipe in all sizes and grades is exported to every major area in the world. With half a century of tubular steel production behind it, Sumitomo's modern mills turn out a complete range of seamless and welded steel pipe, including oil country tubular goods, water and gas pipe, scaffolding pipe, special alloy-steel pipe for boilers, etc. Write for our illustrated catalogue.

LEADING PRODUCERS OF STEEL PIPE, WIRE RODS AND ROLLING STOCK PARTS

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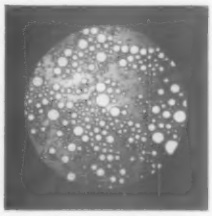
another
TRETOLITE SERVICE
report

TRETOLITE FIRST

WITH FOUR MONEY-SAVING AIDS TO PRODUCERS

The following four production aids have been field-proved by billions of barrels of treated crude—and have saved producers literally billions of dollars over the years.

1. TRET-O-LITE*
Demulsifiers



The first chemical demulsifier used in the petroleum industry for the recovery of emulsified crude oil was invented by William S. Barnickel, founder of the Tretolite Company. Since then, TRET-O-LITE demulsifiers have rendered useful millions of barrels of crude oil that might otherwise have been lost. Today, many TRET-O-LITE formulas are available not only for the recovery of emulsified production, but also for salt removal from crude oil, and useful oil salvage from tank bottoms and slop oil systems.

2. KONTOL*
Organic Corrosion Inhibitors

Tretolite Company research and field engineering developed the first organic corrosion inhibitors specifically for petroleum equipment and pioneered their first application. Today, KONTOL Corrosion Inhibitors are used in the production (as well as refinery and pipeline) departments of leading oil companies everywhere.

3. SOLVO*
Paraffin Removers

Paraffin removers which contain neither carbon bisulfide nor organic chlorinated solvents were first introduced by Tretolite. The harmful effects of chlorides in crude oils on certain refining catalysts have made clear the need for such chloride-free paraffin removers.

4. FLUDEX*
Multi-purpose Water Flood Additives

Another Tretolite "first", this series of products combines the features of organic corrosion inhibitors, bactericides, scale preventives and wetting agents. Widely used in water-flood operations, FLUDEX additives increase injectivity, and at the same time, mitigate problems arising from corrosion, bacteria and scale. They are also being effectively applied for backwashing water-flood filters, water clarification, and stimulating production in stripper wells.

Because Tretolite has developed and pioneered the application of these products, this organization can offer you a brand of experience and service in the manufacture, use and know-how of these products that's unequalled anywhere else in the industry.

For further information on how these and other money-saving Tretolite aids can fit into *your* operation, *ask the Man in the Red Car*—your own Tretolite Field Service Engineer.

*TRET-O-LITE, KONTOL, SOLVO and FLUDEX *are registered trade-marks of Petrolite Corporation.*

TF59-1

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CORPORATION

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U-65

has what you need in a . . .

BING HANGER

For dual or triple completions, the O-C-T U-65 Tubing Hanger has no peer in the number of advantages offered—in mechanics, economy and safety. This component part of the O-C-T Universal Tubing Head allows all strings of tubing to be raised simultaneously at completion.

But, other advantages are major. Check them:

- Simple, direct setting procedure
- Need for sleeve valves eliminated
- Completion is with tree in place
- Flange connections can be field-tested
- Complete range of sizes, working pressures

LOOK TO O-C-T FIRST FOR WELLHEAD EQUIPMENT. YOU NEED LOOK NO FURTHER.

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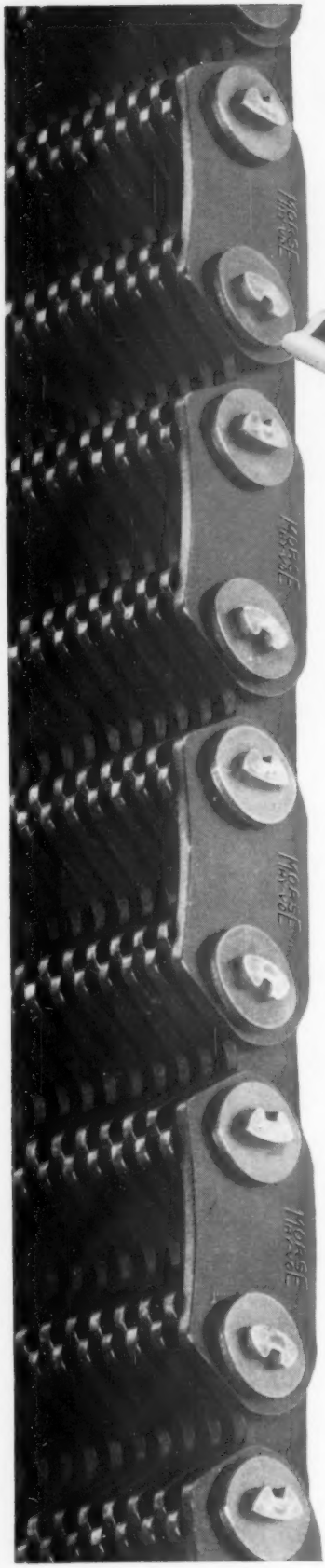
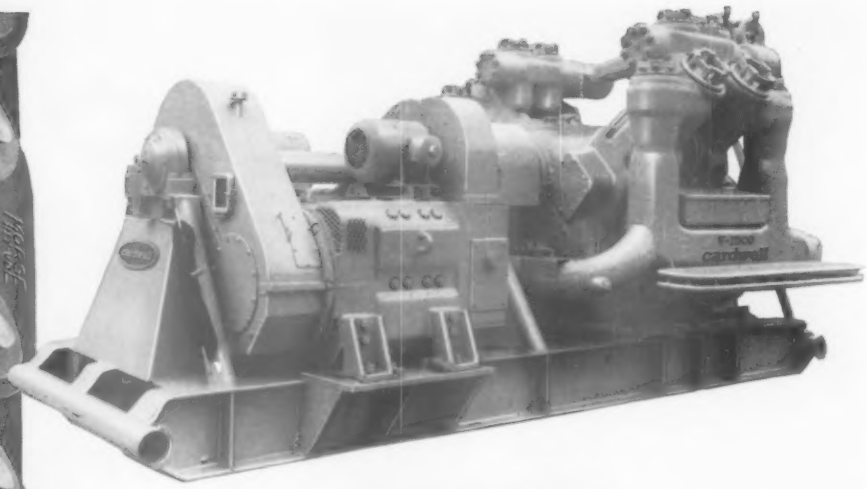




MORSE HY-VO® DRIVES

Compound Power For World's Highest Capacity Slush Pump!

Two 750 hp electric motors at 1200 rpm are compounded through Morse HY-VO Drives . . . 27-tooth to 49-tooth sprockets using 1½″ x 8″ HY-VO Chains . . . each of 152 links or 19 ft in length

Here is an outstanding example of how Morse exclusive Hy-Vo* Drives break through the speed barrier with performance unequalled by any roller chain . . . another contribution to modern oilfield product design. Through Hy-Vo capacity for both speed and power, in compact size, these drives permit Cardwell to build not only the world's highest capacity slush pump, but the world's most compact, lightest weight, unit per horsepower.

For more than nine consecutive years Morse Hy-Vo Drives have demonstrated that any pitch of any Hy-Vo Chain will run faster than the equivalent pitch of roller chain and carry far more horsepower. For further information write Morse Chain Company, Dept. 22-10, Ithaca, N.Y. Warehouses in Casper, Wyoming; Houston and Odessa, Texas; Farmington and Hobbs, N.M.; Los Angeles, Calif. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

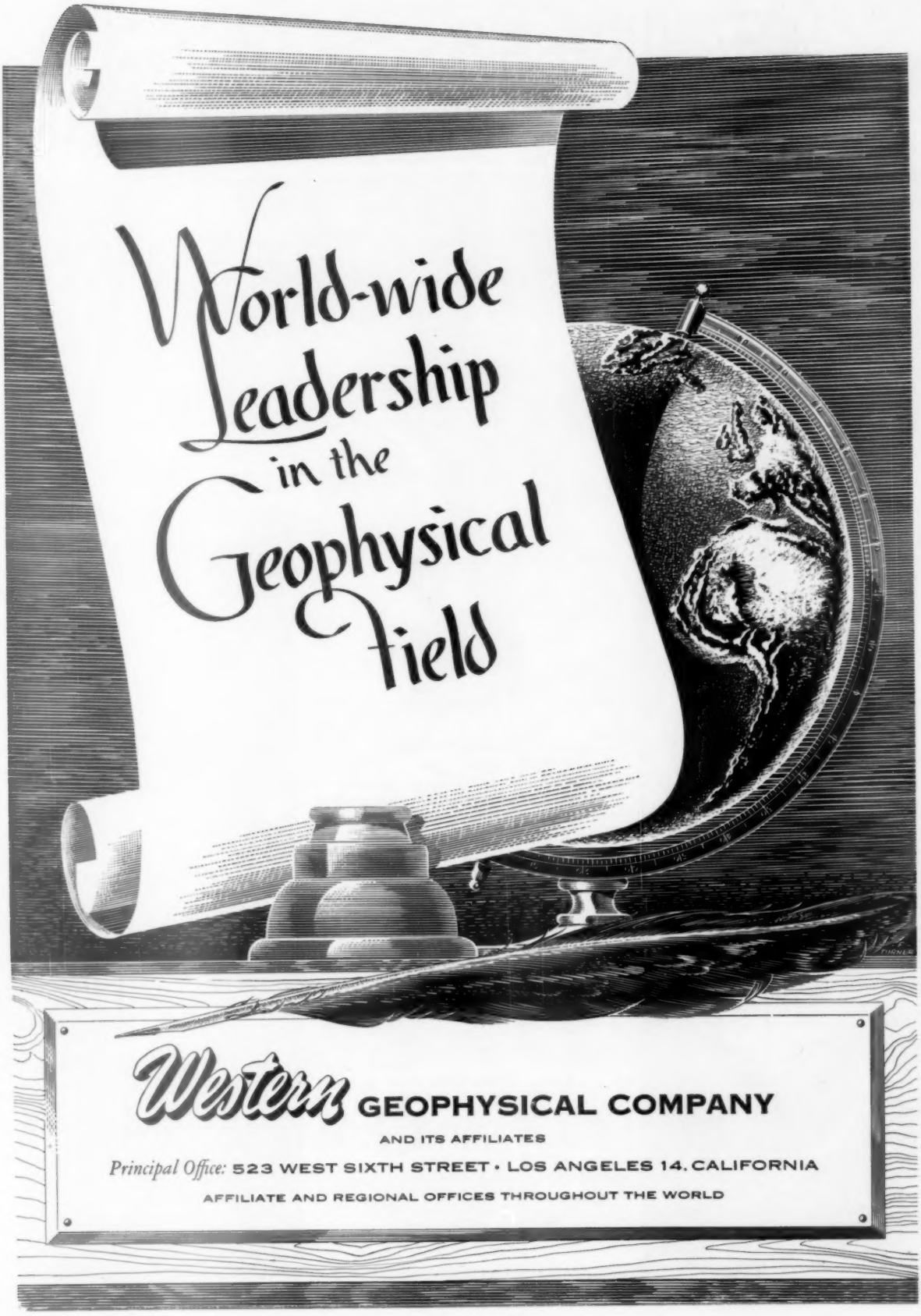
*"HY-VO", the coined name for this exclusive Morse design (from High Velocity and Involute, the sprocket tooth design) which differs widely from conventional chain design. U. S. Patent No. 2,725,755.

MORSE B-W

A BORG-WARNER INDUSTRY

ONLY MORSE OFFERS ALL FOUR:

1. CHAIN AND TIMING BELT DRIVES
2. EBERHARDT-DENVER SPEED REDUCERS
3. FLEXIBLE COUPLINGS
4. WIDE CAPACITY CLUTCHES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Field
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MAGCOBAR TECHNOLOGY

cuts the cost of drilling. At Magcobar, drilling mud is a scientifically designed combination of chemicals engineered to meet your drilling conditions as they occur and to result in the lowest possible over-all drilling cost. And with Magcobar you get the right drilling chemicals *used right*—backed by chemists, reservoir engineers, and laboratory facilities. All of this . . .

HELPS OPERATORS

with drilling fluids that reduce or prevent damage to the pay. Often, completions are quicker, production higher, and there is less need for expensive stimulation work. Because of Magcobar's advances in drilling mud technology, today's wells are worth more to the operator and cost less to produce than similar wells only a few years back. But Magcobar also . . .

HELPS CONTRACTORS

to cut total drilling costs by using the right mud products *right*. Magcobar products and engineering in partnership with the contractor result in faster drilling, greater safety, and a more profitable operation. Magcobar technology helps by reducing friction to increase the life of mud pump parts, reducing torque, swivel wear, load on chains, rotaries, drive system, and engines. Helps . . .

TO MAKE FASTER PENETRATION

to cut the cost per foot of drilling. Faster penetration means savings in bits, fewer round trips, and fewer operating hours. But the problem of fast drilling is only partially one of chemicals. That is why more and more drillers call Magcobar engineers before starting. This combination of Magcobar products and planned engineering means faster drilling, greater safety, and higher profits.

Here's how Magcobar cuts drilling costs around the world . . .

T-8®

compound is a one-package additive which builds and maintains a shale control mud. Proper use results in lower mud cost, greater hole stability, and more uniform properties.

BIT LUBE

is a slightly viscous, oily fluid which gives to drilling fluids many of the properties of an extreme pressure lubricant. Bit Lube protects bit bearings, to increase bit life, and reduces hole friction, resulting in faster penetration with fewer round trips.

MAGCONATE

is a powerful emulsifier for oil-in-water emulsions. It allows the use of higher bit weights without balling problems. It forms a very tight emulsion, making for lower filtration loss and a reduction in surface tension of the filtrate.

Magcobar
Complete
DRILLING MUD SERVICE

Magnet Cove Barium Corporation
Houston, Texas, U.S.A.

SPERSENE

a chemically modified lignosulfonate, is a highly effective thinner in gyp, lime, and salty muds. It is readily soluble in fresh or salt waters. It lowers viscosity more effectively, at less cost, than many of today's leading thinners.

LEATHER-FLOC®

is a tiny clinging type of fiber that has the greatest sealing capacity against seepage losses of any lost circulation material. It will improve or tighten a seal where a bridge has been established by coarser materials. It improves the seal of loose, large particles.

WELL DONE WITH MAGCOBAR TECHNOLOGY

A 4-POINT BUYER'S GUIDE TO BEST DRILLING STRING VALUES

#1 A Spang drilling string is the industry's only fully integrated string

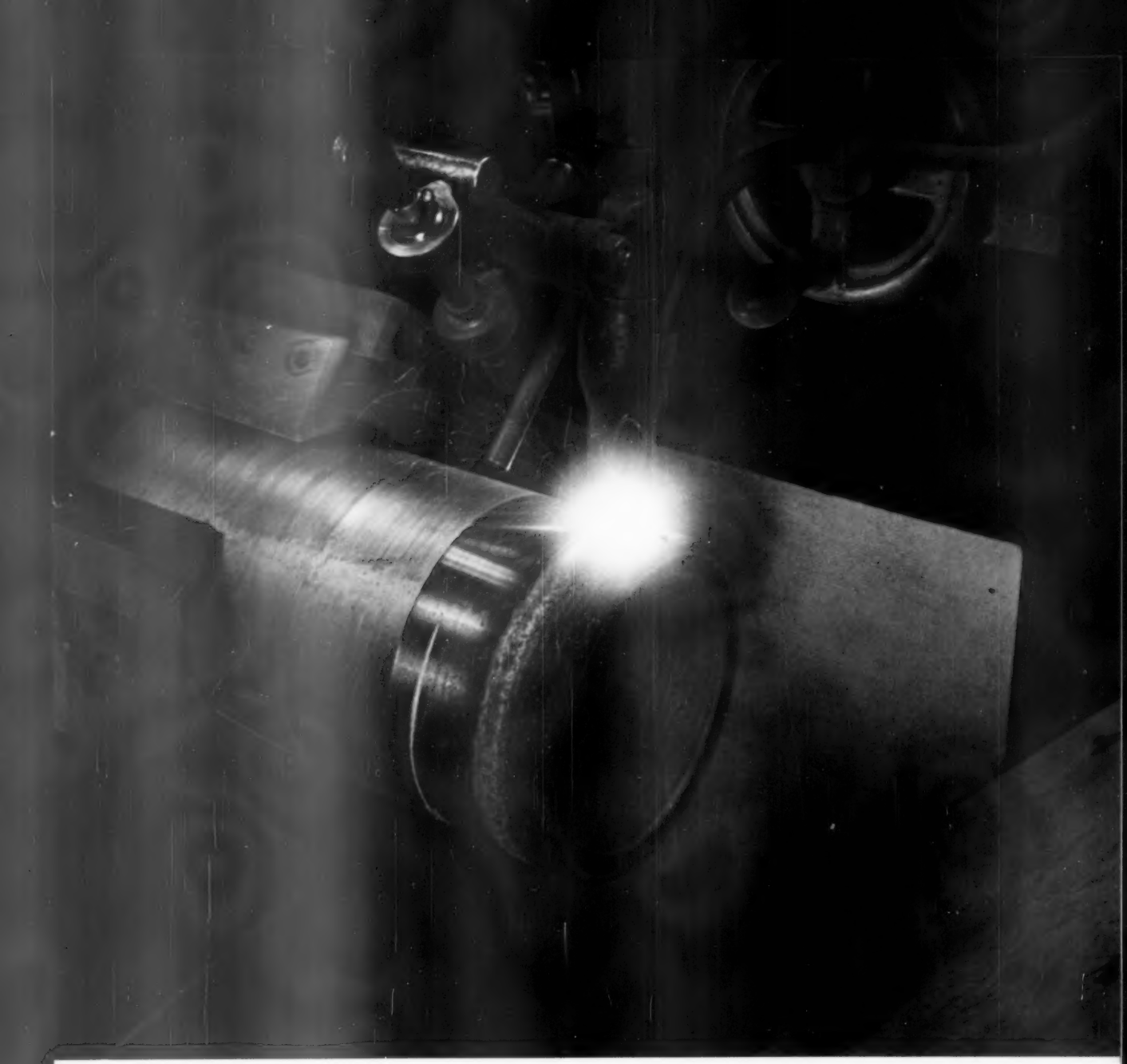
National Supply is the only company in the industry manufacturing both the drill pipe and the tool joints. From this *single* responsible source, you get a string that is quality controlled from start to finish.

NEXT . . .

#2 Spang leads in tool joint design—the critical area of pipe service life

SPANGWELD TOOL JOINTS are welded to the drill pipe by an automatically controlled operation insuring accurate alignment and a high quality weld. The welding permits a streamlined contour and a reduced number of threaded elements. This tool joint connection also allows the smallest practical O.D. and maximum bore—a definite advantage for slim hole drilling.

SPANG DOUBLE SEAL SHRINK THREAD TOOL JOINTS can be easily removed and replaced in the field. The joint design of SPANG Double Seal has an outer seal, threads and inner seal all on a single cone. This insures uniform, reliable installations both at the mill and in the field, and completely seals against internal and external pressures.

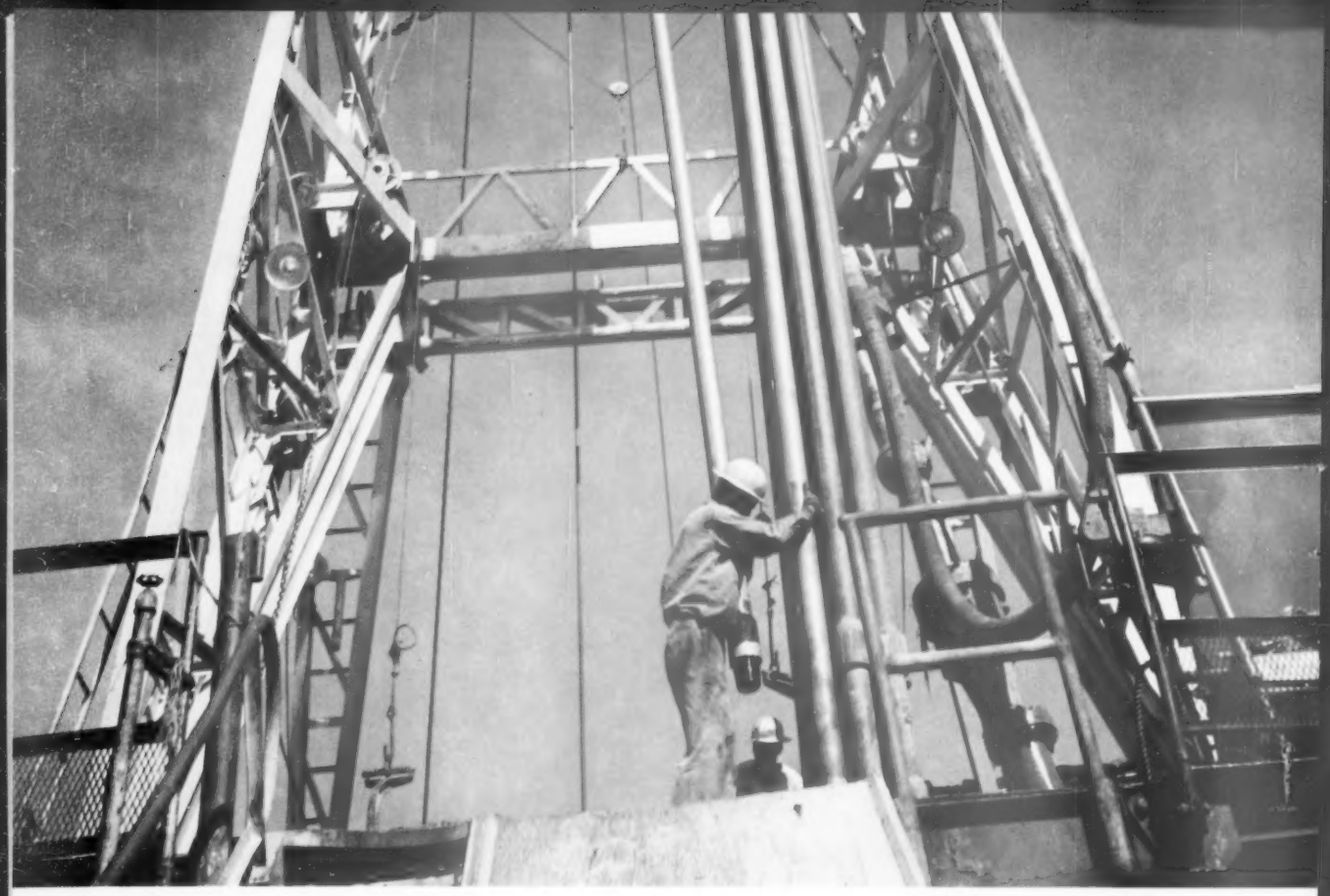


#3 Spang offers the best selective protection against abrasion and corrosion

SPANG HARDFACING (above) is a superior protection for tool joints in abrasive formations. It consists of multiple bands of tungsten carbide, *continuously* overlapped on the joint to form a solid particle-to-metal band. Method of application is the tungsten inert gas welding process.

SPANG PLASTIC COATING—the result of ten years of research—gives the best protection against corrosion. Scientifically applied at the mill on specially developed facilities, SPANG Plastic Coating is available not only in SPANG Drill Pipe but also SPANG Casing, Tubing and Line Pipe.

and finally...



#4 Spang consistently sets the performance standards by which all other tubular products are judged

Operators know that the established quality of SPANG Drill Pipe pays off in the well. That's why SPANG is almost always specified for the deepest wells . . . the big, important jobs.

Conclusion:

You get the best when you buy SPANG!

THE NATIONAL SUPPLY COMPANY

Two Gateway Center, Pittsburgh 22, Pennsylvania

Subsidiary of Armco Steel Corporation

DIVISION OFFICES: Calgary, Columbus, Dallas, Denver, Houston, Torrance, Tulsa

EXPORT: 600 Fifth Avenue, New York 20, N.Y., U.S.A.; City Wall House, Chiswell Street, London E.C. 1

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Let Pipe Line Service carry that load!

Coating and wrapping facilities located near major pipe-producing areas provide buying flexibility, uniform protection

Because PLS plants with their vast storage areas are so strategically located, your pipe buying procedure can be greatly simplified . . . a load of detail lifted off your shoulders. You order from the desired pipe mill, specify delivery to the PLS plant serving the area, and we take it from there! There's always room at our 150 acres of plant sites to store your pipe until the exact time of need. Pipe can be released for processing and be on its way to the project in a matter of a few days. Savings in time often add up to weeks when plant-applied coatings are specified. Delivery of PLS coated and wrapped pipe is assured WHEN you want it, where you need it. So, let PLS carry that load for you. Call our nearest representative and get all the details.

Sales offices at all plant locations... and Atlanta, Georgia; Houston, Texas; Lincoln, Nebraska; Syracuse, New York; and Dallas, Texas

PIPE LINE SERVICE CORP. SERVICE COATING WRAPPING FRANKLIN PARK, ILL.

Pipe Line Service Corporation

FRANKLIN PARK, ILLINOIS

Quality pioneers in coating and wrapping pipe for over a quarter century

A SUBSIDIARY OF AMERICAN STEEL FOUNDRIES

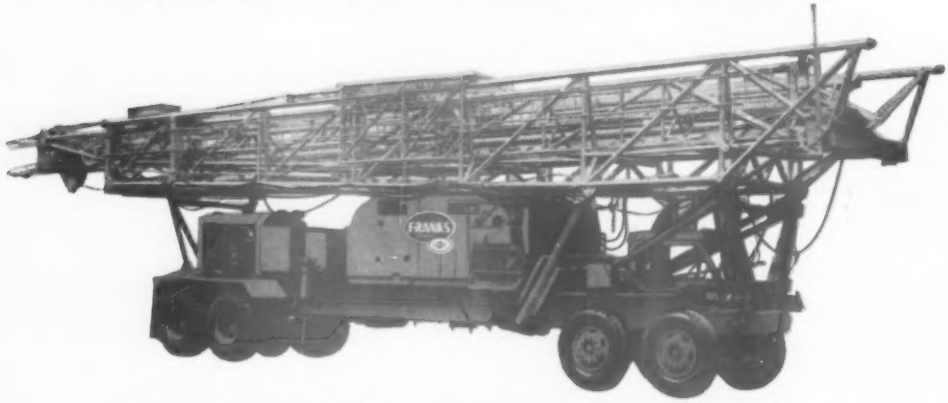
Explorer Rocket

THE MOST IMITATED

Explorer Cruiser

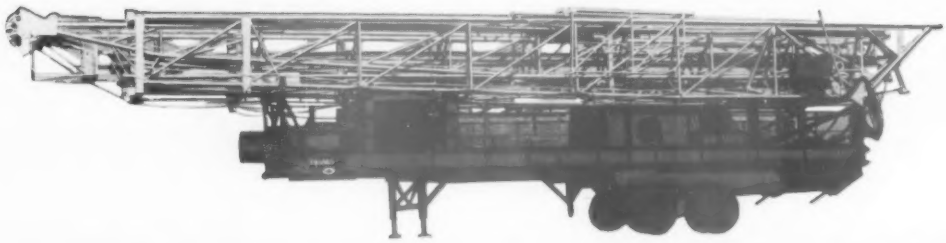
UNITS IN THE FIELD...

Clipper



Comet

BUT NOT DUPLICATED



OFTEN IMITATED . . . NEVER DUPLICATED

WORTH MORE WHEN YOU BUY 'EM
WORTH MORE WHEN YOU TRADE 'EM

Common sense will tell you that there **is** a difference in most things despite the tendency to imitate the leader. There's a difference in baseball players . . . in cooks . . . yes, even in oil well servicing units . . . although competitive units are getting to look mighty like the Franks Explorer.

Now, this **difference** is what keeps the Franks Explorer ahead of the pack. It's the difference which makes superintendents prefer Franks units on their jobs. It's the difference you feel in your pocketbook when you trade it in. The higher resale value of Franks Explorers speaks louder of this difference than any words we can dream up.

Ask the man who uses Franks!

"WORTH MORE" FRANKS FEATURES

- Full view control console
- Engineered weight distribution
- True capacity rated derricks, 100,000 to 275,000#
- Less downtime thru industrial engine economy, power and dependability
- High resale value as used equipment
- Field acceptance established

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CB&I's *coordinated services* played a major role in construction of three new petrochemical plants recently placed on-stream by Petroleum Chemicals, Inc., at Lake Charles, Louisiana.

CB&I's assignment: Fabricate and erect 13 processing towers and 33 storage tanks for an expansion program that would—and did—put three plants in operation during a four-month period.

The new plants—ammonia, ethylene and ethylene oxide-glycol—have catapulted Petroleum Chemicals into a major petrochemicals producer, less than four years after its founding.

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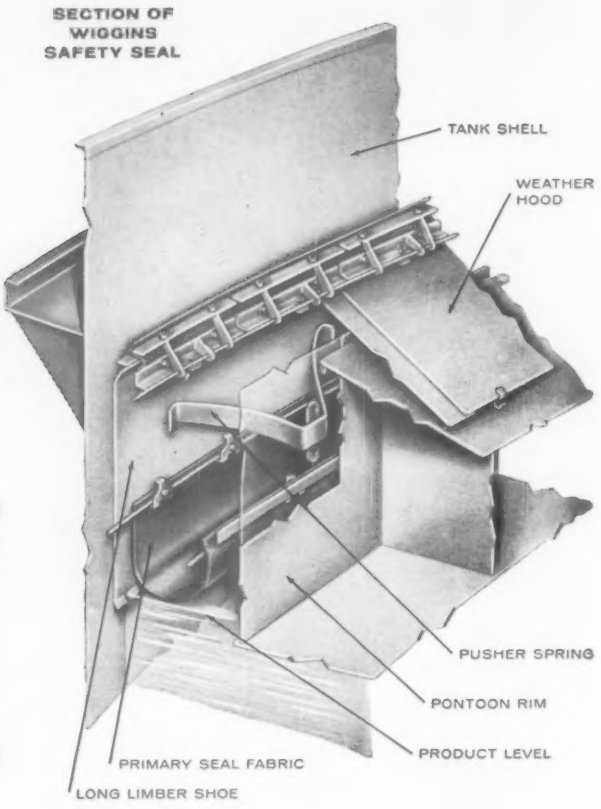

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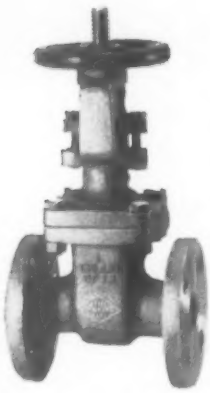
Selection of Stainless Steel Valves can be as simple as selection of Bronze and Iron valves

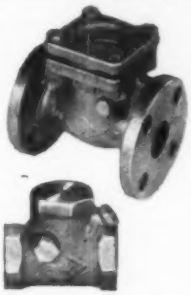
HOW to keep it simple? Don't let the wide selection of stainless steel alloys "throw you"!

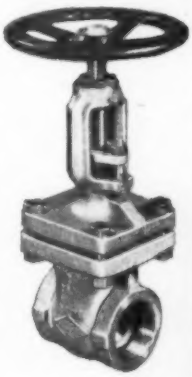


Most of the alloy specs were developed to meet certain highly specialized and rather uncommon needs. Only 1 out of 100 valve users can make practical use of many of the alloys. *Actually, just two or three of the different available alloys will give a big majority of valve users all they want and need.*

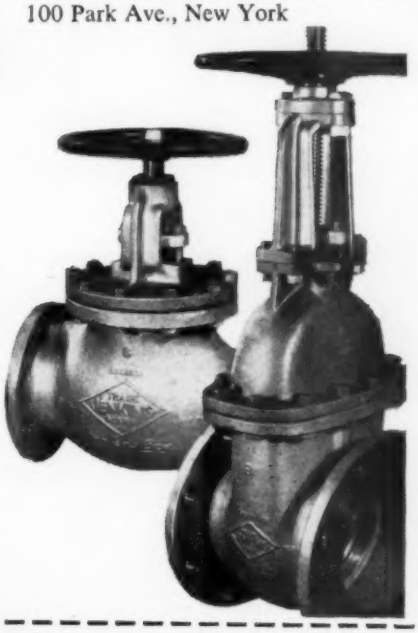
You can judge DESIGN differences between the various "makes" exactly as you do it with Bronze and Iron valves. Look them over and compare. Basically, of course, a Stainless Steel valve is designed and constructed very much like other valves.

What is left to worry about in addition to Material and Design? The same factors you consider in buying ANY valves for long, dependable performance: Are the valves made merely good enough, or to a standard that demands an extra-measure of quality? How good are the castings? How precise and perfect is the machining? How rigid is the inspection and testing during manufacture? These are the factors which specs can't cover. Some of them you can't see when you look at the valve. But you KNOW how to make sure they measure-up to peak standards. You know that the name JENKINS VALVES and the famous Jenkins DIAMOND trademark have been the highest assurance of quality for nearly a century.





Specify "Jenkins" as well as the metal alloy to assure fullest satisfaction. Your Jenkins Distributor has patterns and alloys to satisfy most industrial needs. Of course, they meet valve industry specifications and the high standards established by leading users of stainless steel valves. Jenkins Bros., 100 Park Ave., New York



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From natural gas and oil... heat, power, petrochemicals that mean ever wider service to man.

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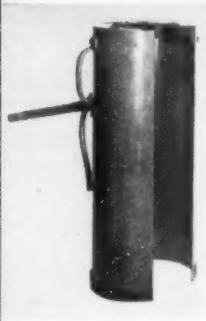
With WECO Unions on your blow-out preventer hookups . . . mud lines, stand pipe . . . water, air, fuel and steam lines, rig piping can be made-up and broken-out in the shortest possible time.

WECO TUBING WET BOX



Light and easy to handle, the Wet Box clamps around the tubing joint and prevents fluid from spraying over the work area, endangering the safety of the crew. It is easily handled, manually . . . fully opened and tightly closed by a single operating handle. One box can be used for all tubing sizes by changing the rubber seal in the top of the box.

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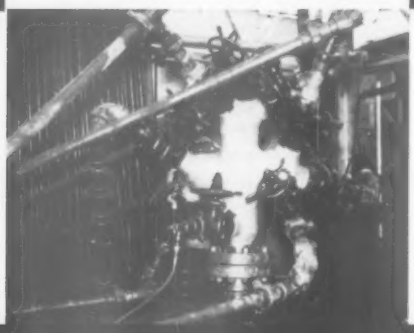
WECO Unions simplify piping lay-out, and speed-up installation of flow lines . . . headers and manifolds . . . heaters, treaters and separators . . . metering station hookups.



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WECO Unions are unexcelled for dependable, leak-proof connections on suction and discharge lines, manifolds and heads, for cementing, acidizing and fracturing services.

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WECO AIR-O-UNIONS on mud tanks and suction lines save hours of rig-up time. With the union welded in place, pipe is slipped into it and the tube inflated with a shot of air . . . no bolts, nuts, wrenches are required to make-up and seal the WECO AIR-O-UNION. Sizes 4" through 16".

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They Say—

Centennial thanks due

Dear Sir:

In his recent editorial reprinted in the Titusville Herald, Mr. Henry Ralph of The Oil and Gas Journal appears to be taking the petroleum industry mildly to task for faltering in its footsteps to do honor to Colonel Drake in 1959. (OGJ, "Journally Speaking," Jan. 4, p. 39).

He seems to raise a cynical eyebrow at the thought of this great industry letting down its hair and waxing a bit sentimental on its 100th birthday. Further, he urges it to let Drake stay buried now and get on with the more important and crucial business at hand, as though this festive pause had caused a world-shaking delay in the advancement of the cause of petroleum.

It seems to me that none of our great industries, including petroleum, could ever be accused of being sentimental or soft-hearted, basically . . . I feel that Mr. Ralph has directed his comments wrongly.

The interested and public-spirited citizens of the original oil region, together with the local oil and other companies, can testify to the initial reticence of the petroleum industry as a whole to bestir itself on behalf of Colonel Drake and the place where he started the whole thing. Had it not been for a few strongminded people in this area, I am afraid that the centennial of oil would have passed with very little notice.

While it is to its great credit that the petroleum industry did finally climb on the bandwagon with both feet, I think that Mr. Ralph should have given praise to those stalwart souls with enough interest in the original oil region who had the guts and perseverance to interrupt the footsteps of this great industry sufficiently to make it pause and shed a gentle tear at the grave of Colonel Drake on the 100th anniversary of its birth.

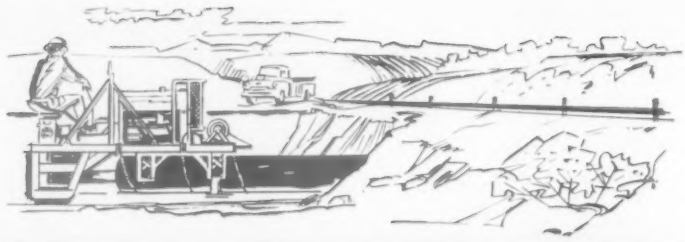
J. E. Fleming, Jr., in a letter to the editor of the Titusville, Pa., Herald.

A chance for leadership

"Mere coexistence is regrettably the rule in relationships between employes and management in far too many organizations.

"No opportunity looms larger than the opportunity to achieve real leader-

CROSE



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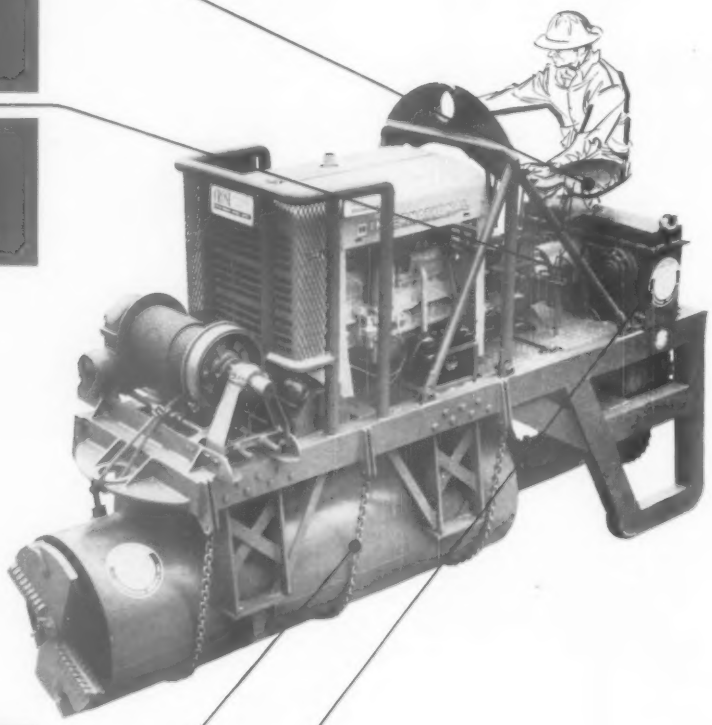
TOP PERFORMANCE



The new Crose Road Boring Machine provides the fastest, simplest, most economical way for boring crossings and installing casings up to and including 42" in diameter. Heavy duty torque converter and reverse-o-matic transmission deliver full, constant speed and smooth power flow . . . let you switch auger from forward to reverse without engine slowdown . . . no gear shifting.

The smaller Model RBA Crose Road Boring Machine is still available for casing up to 24".

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ship and teamwork in out-producing our rivals and thus serving the welfare and security of the republic.

"We must do more than 'give the employes the economic facts of life,' as the old saying goes. We must provide facts, of course, more than we ever have before, but we must also work to protect the right of every employe to think and act independently.

"We must work to find ways to involve every employe in the goals, the problems, and the progress of the business.

"If we do these things, we will have earned the respect of leadership, and we will not have won an empty victory in technology because we failed in human relations."

Clarence H. Thayer, vice president in charge of manufacturing, Sun Oil Co., in a speech to the American Society of Mechanical Engineers.

Optimistic Oklahoman

"The 5% increase in import quotas represents about 79,000 bbl., and most of this increase is in residual fuels which hurts the independent the least.

"In contrast, the increase in domestic demand will be about 500,000 bbl. Oklahoma has 8% of the national market so we can look to 40,000 to 45,000 bbl. as our share of the increased demand.

"This means Oklahoma producers can look for a firm demand for a basic allowable of 23 to 25 bbl. daily (present allowable is 20 bbl. and has been lower than that in recent months).

"With a firm market for higher allowables and new rules (expected early this year) to create a better climate for drilling, Oklahoma can expect to see a pickup in activity in 1960."

Paul R. Schultz, president of Oklahoma Independent Petroleum Association, in a speech to the Enid, Okla., Lions Club.

Amazing indifference

"It is easy to see the impact of government whenever it involves what we earn and spend. However, it is not always as easy to be conscious of other ways in which the government is intruding into our lives.

"Yet those intrusions are often just as significant. Take the impact of government on our work. Today our whole pattern of company operation is affected by government legislation and regulation.

"It seems as though anywhere you look, government and politics have moved into our personal affairs. The

"wherever oil men gather"

You don't just walk out and put up an oil derrick. No sir. It takes a lot of planning, plotting, sounding, and the cooperative efforts of geologists, engineers, drillers and oil executives. And it takes a lot of money, too; each foot of well may cost a couple of thousand dollars or so. That's why when oil men get together, sooner or later, someone will mention financial matters. And that's when, more and more, you're sure to hear someone say, "For my money it's THE FORT WORTH NATIONAL BANK!"

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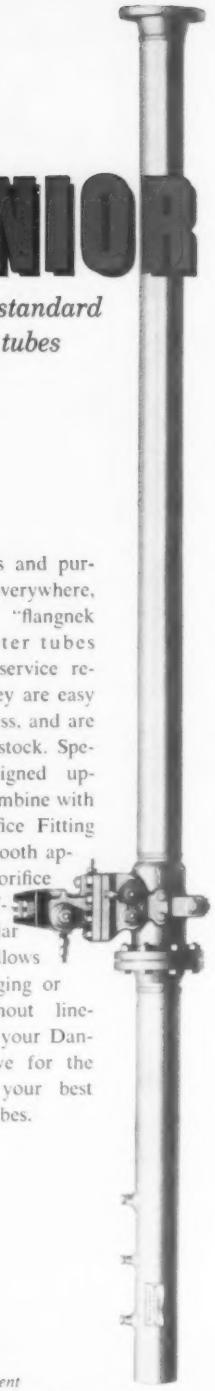
flangnek standard meter tubes



Used at sales and purchase stations everywhere, Daniel Senior "flangnek standard" meter tubes meet exacting service requirements. They are easy to order, cost less, and are available from stock. Special, factory-aligned upstream tubes combine with the Senior Orifice Fitting to provide a smooth approach to the orifice plate, free of offsets. The popular Senior fitting allows fast plate changing or inspection without line-shut-down. See your Daniel representative for the full story on your best buy in meter tubes.

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question for us is, 'Have we moved into politics?'

"For most of us, the answer is no. We let the politicians, the pros, take care of our elections and our government.

"The citizen's indifference is nothing short of amazing to the politician. He knows how easy it is to take effective part in political and government affairs.

"It is even more amazing when you think that the average employe pays for government with 13 hours of every 40 hours' pay, a total of more than 600 hours a year. Yet, he spends no more than 2 or 3 hours a year to protect his investment."

"Politics Is Our Business," article in the December issue of "Horizons," magazine of Pan American Petroleum Corp.

Letters to They Say should be addressed to The Editor, The Oil and Gas Journal, Box 1260, Tulsa, Okla.

CALENDAR

JANUARY

25-28 Plant Maintenance and Engineering Show, produced by Clapp & Poliak, Inc., Convention Hall, Philadelphia.

27-28 Western Petroleum Refiners Association, Gulf Coast regional technical-industrial relations meeting, White Plaza Hotel, Corpus Christi, Tex.

31-Feb. 3 Pipe Line Contractors Association, annual meeting, Ambassador Hotel, Los Angeles.

FEBRUARY

1-4 Instrument Society of America, instrument-automation conference and exhibit, Rice Hotel and Houston Coliseum, Houston.

8 Alberta Division of Canadian Petroleum Association, annual meeting. Hotel Palliser, Calgary.

7-10 American Association of Petroleum Geologists, Rocky Mountain section annual meeting, Billings, Mont.

9-10 University of Oklahoma, advanced petroleum engineering seminar, Norman, Okla.

14-18 American Institute of Mining, Metallurgical, and Petroleum Engineers, annual meeting, Statler-Hilton and McAlpin hotels, New York.

21-24 American Institute of Chemical Engineers, meeting, Biltmore Hotel, Atlanta.

24-25 Wisconsin Petroleum Association, annual convention and exhibit, Schroeder Hotel, Milwaukee.

24-26 National Association of Corrosion Engineers, Tulsa section, eleventh annual corrosion short course, Mayo Hotel, Tulsa.

26 Natural Gasoline Association of America, Permian Basin regional meeting, Lincoln Hotel, Odessa, Tex.

26 Ohio Oil and Gas Association, winter meeting, Deshler-Hilton Hotel, Columbus, Ohio.

MARCH

2-4 American Petroleum Institute, Division of Production, southwestern district meeting, Statler-Hilton Hotel Dallas.

PARAFFIN PROBLEMS?

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Dowell Paraffin Solvent is designed to free your wells of production-robbing paraffin. It will dissolve both pure and impure paraffin containing asphalt, sulphur, gum and salt. Effective for cleaning formation faces, tubing, rods, lead lines, tanks, screens, liners and perforations. **Non-chlorinated.** Easy to use. Easy to buy, too. Available at oil field supply stores and at Dowell stations.

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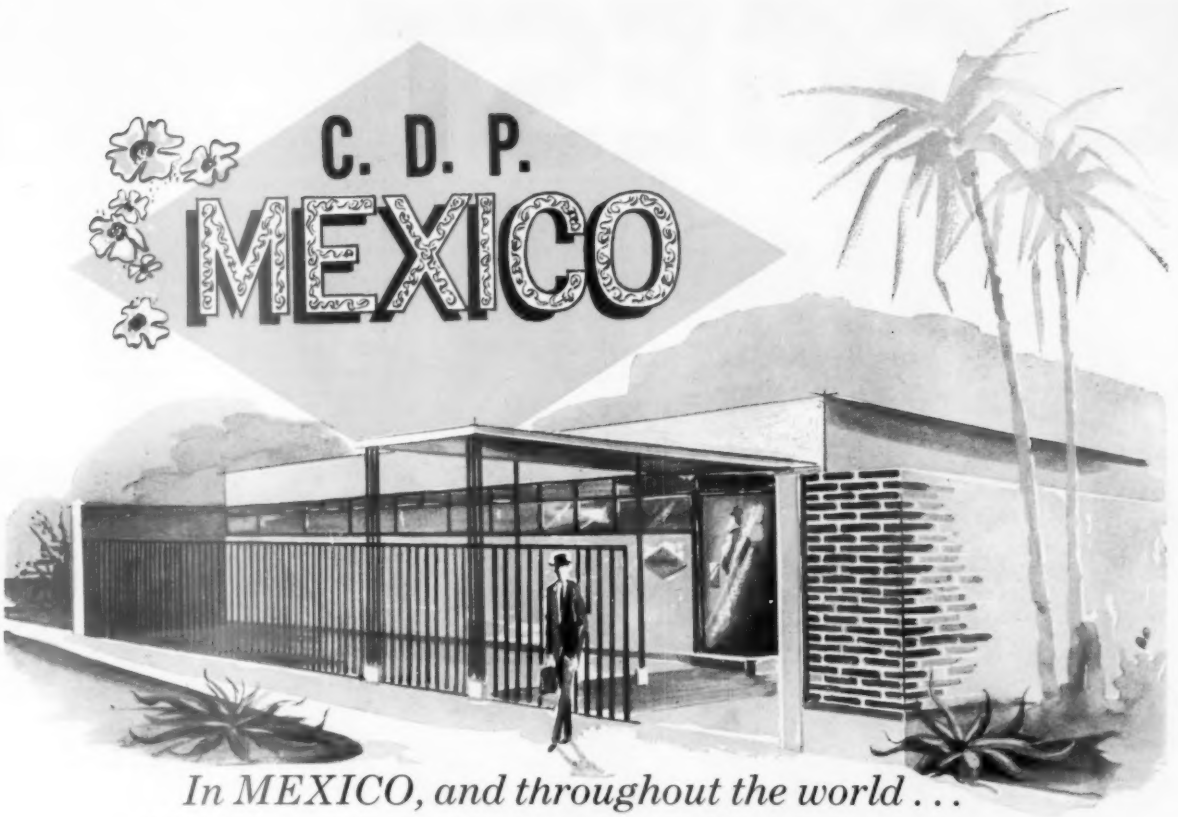

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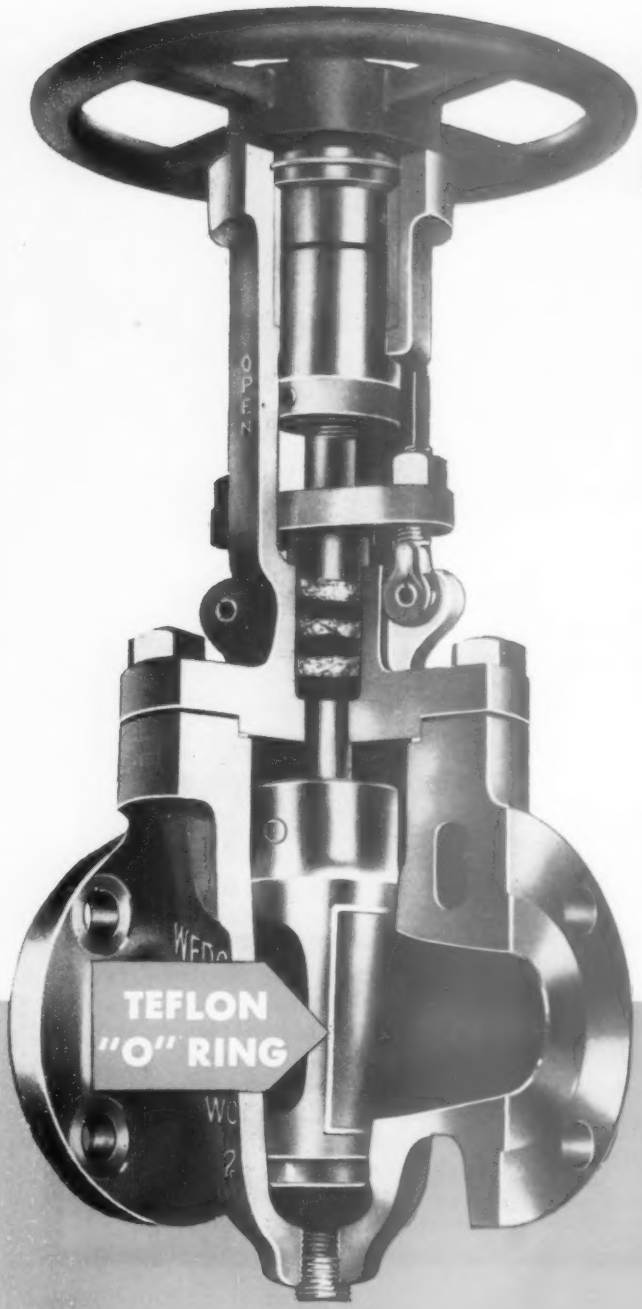
Christensen's new Mexico City manufacturing plant and sales office assures you of the same high quality products and fast, dependable service identified with all Christensen plants and sales representatives throughout the world. For detailed information on our complete line of drilling and coring equipment, write or call Christensen today.

BIGGEST MONEY SAVER



In The Valve Industry!

You're familiar with the expense involved in the lubrication of plug valves — the high monthly cost of man hours, grease and equipment, or of a lubrication service. The contaminating influence of the lubricant is also a constant hazard. Not to mention the sticking and leakage that occur when lubrication of a particular valve is overlooked.

These are some of the reasons why Stockham's Wedgeplug "O-Seal" Valve is rapidly replacing lubricated valves in general purpose services everywhere.

The other reason is, simply, that the non-lubricated "O-Seal" equals or betters the performance of any lubricated valve — without costing a cent for maintenance.

Two Teflon† "O" rings in the plug provide absolute shut-off — shut-off that remains permanently "bubble-tight" on both the upstream and downstream seats. Thus, the "O-Seal" provides double-block and bleed in most services. The "O-Seal" has proven itself absolutely leakproof on hundreds of services.

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Call your Stockham Distributor or Sales Representative now, or write Stockham for complete details about how you'll save money — from now on — with

Stockham's NON-LUBRICATED Wedgeplug* "O-Seal" Valve

Complete ranges of sizes and types available.

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Sold Only Through Distributors

3-4 American Gas Association, Pacific Coast Gas Association, joint public relations conference, Biltmore Hotel, Santa Barbara, Calif.

6-9 American Society of Mechanical Engineers, gas turbine power and hydraulic conference, Rice Hotel, Houston.

7 Canadian Petroleum Associaton, annual general meeting, Hotel Palliser, Calgary.

7-8 University of Florida, annual heat transfer symposium, Engineering and Industries Building, Gainesville, Fla.

14-18 National Association of Corrosion Engineers, sixteenth annual meeting, Memorial Auditorium, Dallas.

16 Petroleum Equipment Suppliers Association, eastern district membership meeting, Duquesne Club, Pittsburgh.

16-18 American Petroleum Institute, Division of Production, southern district meeting, Hilton Hotel, San Antonio.

18 Natural Gasoline Association of America, Oklahoma regional meeting, Biltmore Hotel, Oklahoma City.

21-23 Midwest Gas Association, annual meeting, Hotel St. Paul, St. Paul.

22 Petroleum Equipment Suppliers Association Gulf Coast district membership meeting, Shamrock Hilton Hotel, Houston.

24-25 New England Gas Association, annual meeting, Hotel Statler-Hilton, Boston.

28-30 Western Petroleum Refiners Association forty-eighth annual meeting, Hilton Hotel, San Antonio, Tex.

29-31 American Power Conference, annual meeting, Sherman Hotel, Chicago.

30-Apr. 1 American Petroleum Institute, Division of Production, Mid-Continent district meeting, Broadview Hotel, Wichita.

APRIL

3-8 Engineers Joint Council, sixth nuclear congress, New York.

4-7 Oil Heat Institute of America, annual convention, Park-Sheraton Hotel, New York.

4-7 National oil heat and air-conditioning exposition, Coliseum, New York.

5 Petroleum Equipment Suppliers Association, southern mid-continent district membership meeting, Statler-Hilton Hotel, Dallas.

5-7 Instrument Society of America, national chemical and petroleum instrumentation symposium, Rochester, N. Y.

7-8 Rocky Mountain Oil and Gas Association, midyear meeting, Newhouse Hotel, Salt Lake City.

12-14 Petroleum Industry Electrical Association, Petroleum Electric Supply Association, conference and exhibition, Municipal Auditorium, Kansas City.

19-21 University of Oklahoma, College of Engineering, southwestern gas measurement short course, north campus, University of Oklahoma, Norman.

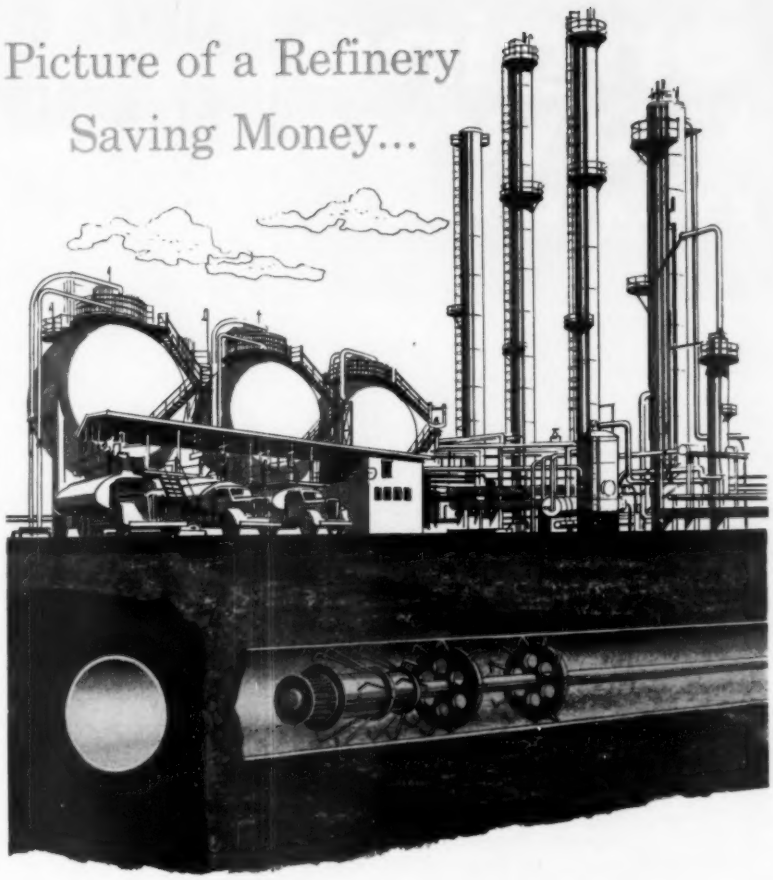
20-22 American Petroleum Institute, Division of Production, Rocky Mountain district meeting, Gladstone, Henning, and Townsend hotels, Casper, Wyo.

20-22 National Petroleum Association, semiannual meeting, Hotel Cleveland, Cleveland.

21-22 Texas Technological College, seventh annual West Texas oil lifting short course, Lubbock, Tex.

21-23 Society of Economic Paleontologists and Mineralogists, Permian basin section annual meeting and field trip, Abilene, Tex.

24-26 Independent Petroleum Association



Spunline Relines Pipe Lines in-place without removing the pipe

Another refinery, it could be in Texas, California or Montana, will soon be enjoying the savings of another rehabilitated pipe line. The flow will increase, the pumping cost will drop and the pipe line will be good as new for at least another quarter of a century.

And traffic will move without interruption or inconvenience to the public.

Spunline® is applicable to pipe lines down to 4" and may be used in cast iron, steel, concrete and wrought iron pipe lines.

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engine power
BY CATERPILLAR

LIBYAN DESERT PENETRATED BY WORLD'S LARGEST TRAILER-MOUNTED RIG

Few locations subject engines to conditions as brutal as those faced by eight Cat Diesel Engines that power Camdrill International's rig, "Desert Star No. 2." The rig will operate in the Libyan desert where temperatures range from 32° to 130° and sand and dust storms are frequent. The trailer-mounted rig will move twelve to fourteen hundred miles over roadless desert in search of oil.

Engines have oversize radiators, dual air cleaners and dual fuel filters to combat the extreme desert conditions. Special filters give these engines tolerance for fuels from crude oil to higher grade diesel fuels, whatever is available at distant drilling sites.

What kind of engines must a rig like this have? In a word: "Dependable." Another way to say dependable is to say "Caterpillar." Eight Cat Engines furnish all the power this rig needs. Two Cat D397s drive the drawworks through a two-engine, three-shaft in-line compound. An Emsco D300 slush pump gets power from another D397. A propeller shaft drive from the drawworks compound plus a fourth D397 provide power for an Ideco 600 slush pump.

Two D339 Electric Sets, on a utility trailer, power auxiliary equipment and lighting. Power for the base drilling camp site comes from two D342 Electric Sets.

The characteristics of Cat Engines which so well suit them to extreme conditions, such as these, make them your choice where circumstances are less grueling. Portability. Dependability. Extreme fuel tolerance. Freedom from complicated maintenance. Factory parts and service *everywhere* in the free world. Each is a good reason to choose Cat Engines and Electric Sets.

Your Caterpillar Dealer can show you how this combination adds up to high performance when you repower present oilfield equipment with any of the nine basic engines to 750 HP or Electric Sets to 375 KW. Remember, too, to specify Cat power when ordering new equipment.

WORLD'S LARGEST TRAILER-MOUNTED DRILLING RIG is this Camdrill, Inc., rig of basic Ideco Desert Rambler design. The giant rig can drill to 10,000-foot depths, is mounted on five semitrailers on 21:00 x 25-inch sand tires and will travel twelve to fourteen hundred miles over Libyan desert. Eight Cat Engines furnish all power.

CATERPILLAR

Engine Division, Caterpillar Tractor Co., Peoria, Ill., U.S.A.

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

of America, midyear meeting, Denver Hilton Hotel, Denver.

25-26 American Society of Mechanical Engineers, maintenance and plant engineering conference, Chase-Park Plaza Hotel, St. Louis.

25-27 Southern Gas Association, convention, Buccaneer and Galvez hotels, Galveston.

25-28 American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

25-29 American Welding Society, annual meeting and welding exposition, Los Angeles.

26 Petroleum Equipment Suppliers Association, Pacific district annual membership meeting, Ambassador Hotel, Los Angeles.

27-29 Natural Gasoline Association of America, annual convention, Rice Hotel, Houston.

28-29 American Petroleum Institute, Division of Transportation, pipeline conference, Mayo Hotel, Tulsa.

28-29 Pacific Coast Gas Association, distribution conference, Benson Hotel, Portland.

MAY

1-4 American Petroleum Institute, Division of Transportation, tanker conference, Seaview Country Club, Absecon, N. J.

2-3 Society of Petroleum Engineers of AIME, North Texas section, fourth biennial secondary recovery symposium, Wichita Falls, Tex.

5-6 American Institute of Mining, Metallurgical, and Petroleum Engineers, annual joint meeting of Rocky Mountain petroleum sections, Calgary.

5-6 Canadian Institute of Mining and Metallurgy, annual technical meeting of petroleum and natural gas division, Palliser Hotel, Calgary.

9-12 American Petroleum Institute, Division of Refining, midyear meeting, Statler and Sheraton-Cadillac hotels, Detroit.

9-12 Instrument Society of America, instrument-automation conference and exhibit, Civic Auditorium and Brooks Hall, San Francisco.

9-13 American Gas Association, distribution and transmission meeting, Jung and Roosevelt hotels, New Orleans.

12-13 American Petroleum Institute, Division of Production, Pacific Coast district meeting, Biltmore Hotel, Los Angeles.

12-14 Kansas Independent Oil and Gas Association, annual meeting, Lassen Hotel, Wichita.

18-20 American Petroleum Institute, Division of Marketing, midyear meeting, Statler-Hilton Hotel, Cleveland.

22-26 Air Pollution Control Association, annual meeting, Netherland-Hilton Hotel, Cincinnati.

22-26 American Society of Mechanical Engineers, oil and gas power conference and exhibit, Muehlebach Hotel, Kansas City.

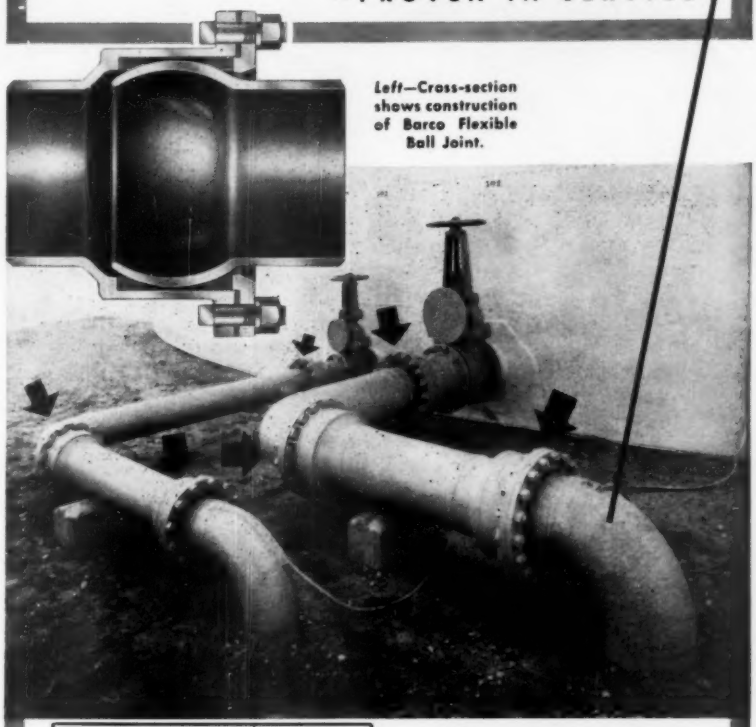
23-24 American Gas Association, production meeting, Roosevelt Hotel, New York City.

25-27 Pacific Coast Gas Association, accident prevention and transmission conference, Hotel Utah, Salt Lake City.

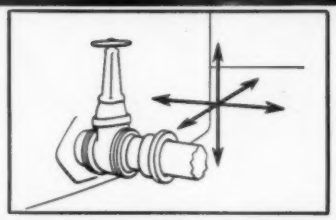
25-28 American Association of Petroleum Geologists, western Canada regional meeting, Banff Springs Hotel, Banff, Alta.

Unlimited Flexibility!

—PROVEN IN SERVICE



Left—Cross-section shows construction of Barco Flexible Ball Joint.



Allows 6-Way Movement!

Freedom of movement in any direction is readily possible with these *ball joint connections* of 12" pipe (right) and 8" pipe (left) to 80,203 bbl. tank shown in above photo. (Photo: SHELL OIL COMPANY, Dominguez Refinery, Wilmington, Calif.)

Barco Ball Joints—*Fire Safe!*

provide complete protection against FIRE, PIPE EXPANSION, TANK SETTLING

Major oil companies throughout the country now approve the use of Barco's new large size Flexible Ball Joints on tank connections for the following reasons:

1. **Fire-safe. The joints have passed rigid fire and water spray tests.**
2. **Superior for handling pipe expansion—no combustible packing, no thin wall sections, no "end thrust" from pressure, no heavy pipe anchoring required.**
3. **Complete protection—relieve strain and twisting forces on valve flanges or tank wall.**
4. **Compact! Ideal for use inside narrow space between fire wall and tank. Easy to design piping for any amount of flexibility desired.**
5. **Also useful for insulating piping against electrolysis.**
6. **Long service life without maintenance. No lubrication. Sizes to 16"; flanged or welding ends.**

For engineering recommendations, see your nearest Barco representative or write. ASK FOR CATALOG 215B and BULLETIN 31-A.

PRODUCTS BACKED BY EXPERIENCE BARCO FOUNDED 1908

BARCO MANUFACTURING CO.

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The Only Truly Complete Line of Flexible Ball, Swivel, Swing and Revolving Joints

In Canada: The Holden Co., Ltd., Montreal

"...pacing the pipeline construction industry
for more than a quarter century"

price tower H·C·PRICE·CO PIPELINE CONSTRUCTORS bartlesville, oklahoma

50 years ago

January 20, 1910

Fort Worth and Dallas prepare for delivery of first natural gas as Lone Star Gas Co. completes 110-mile 16-in. pipeline from Clay County, Texas, fields. City mains of former artifical-gas system to be used.

Organization of American Oilfields, Ltd., by E. L. Doheny, C. A. Canfield, and other officers of American Petroleum Co. and Mexican Petroleum Co. creates widespread speculation in California oil circles. Newly formed company buys 1,200 acres of potentially rich oil lands in West Side Coalinga field, and takes over 3,000-acre holdings of Midland Petroleum Co. in McKittrick and Midway fields.

The Texas Co. leases 270,000 acres of the extensive W. T. Waggoner ranch-land holdings in eastern Wilbarger and western Wichita counties, North Texas. On the land, near Electra, is a well, with 18 ft. of sand showing 41°-gravity oil, which Texaco will attempt to make a pumper.

25 years ago

January 24, 1935

New York's largest gas well roared in last week with record-breaking output of 50,000 M.c.f. daily from Oriskany sand at 4,737 ft. It is on the T. H. Wing farm of the Belmont Quadrangle development in the Steuben County field.

New Mexico becomes first state to approve principle of an interstate oil compact and authorize negotiation of an agreement with other states.

"Sphinx of 26 Broadway" dies in Florida at age of 68. Miss Katharine J. Harrison, known as the woman who "knew all there was to know" about Standard Oil Co., served the company for 21 years, starting as stenographer. At retirement in 1909, she was called the "highest salaried woman in business."

10 years ago

January 26, 1950

Ceremonies, attended by more than 1,000 industry and civic representatives, mark breaking ground for Union Oil Co.'s projected $5,000,000 research center at Brea, Calif., and start of company's sixtieth year of existence.

Oklahoma Supreme Court decision in famous Peerless Oil & Gas Co.-Cities Service Gas Co. dispute upholds authority of Corporation Commission to set minimum field prices for natural gas produced in the state.

First tanker load of crude moves from Iraq Petroleum Co.'s Qatar concession marking beginning of commercial production after 15 years of negotiation, exploration, and development.

JOURNALLY SPEAKING

Clouded Goldfish Bowl

THIS WEEK the Journal delivers its annual "state of the union message" on the condition of the oil industry. We call it the Review and Forecast number.

Our message is told more in figures than in words because, while words may be the language of politics, figures are the language of business and industry.

And just as politicians' words are sometimes ambiguous, evasive, and capable of several interpretations, so too, we have found, may be the figures by which the oil industry presumes to report its condition and guide its activities.

It's not that we don't try valiantly to present more informative figures and more skillful forecasts every year. The fault lies with the industry in not making available quite enough material to enable us to do the complete bang-up job we would like to do.

The situation is improving, though. Today business papers, trade associations, and state and federal agencies routinely obtain a big mass of figures from oil companies, whereas not so many years ago a request for such information would have been met by the reply that the company's business is no business of anybody else.

It's very gratifying, this progressive crumbling of the w a l l of secrecy around business operations. We hope the trend continues, and not just because it makes our publishing job easier. There are a couple of more fundamental reasons.

In the first place, all business these days must operate pretty much in a goldfish bowl. Rightly or wrongly, the public has the idea that private business—and particularly the oil business—is the public's business, and through the press and the Government it keeps prying into business conduct.

So when some company takes the attitude of "none of your business," or "the public be damned," it immediately arouses the suspicion that it is hiding something more than legitimate business secrets.

The more candid the oil industry is with the public, the more it lays its cards on the table, the better its public relations are apt to be. Statistics on industry operations aren't all the public wants to know about the oil business, but they are an important part of it.

In the second place, the better statistics the oil industry has about its current condition, the better it can plan its operations for the future.

To be specific, 1960's oil activity isn't going to develop in a vacuum. It will be based upon and grow out of what happened in 1959. That's why it is important to do a statistical post mortem on 1959 in order to make the most of forecasts we make in this issue.

There's a famous saying that "what is past is prologue," and in the oil business this means that you can't plan your 1960 activity without considering the trends and patterns carrying over from last year.

You'll find many of these patterns and trends spelled out in this issue, but we regret to say that there are some gaps.

For instance, you won't find any index of geophysical activity for the simple reason that we don't consider the available statistics sufficiently complete to be a dependable guide.

Also our drilling forecast is based on a smaller sample than we would like. Every year we get better cooperation from the industry, but if more operators would reply to our confidential questionnaire it would be an even better cross-section of industry plans.

Incidentally, it is slightly amusing that some companies that are the most reluctant to tell anybody what they are doing are among the most avid to have the Journal tell them what the industry as a whole is doing. This just illustrates our point that if individual companies would put out more information they would have more dependable reports on industry-wide trends.

So since the oil business is in a goldfish bowl anyway, both big fish and little fish ought to get out from behind that seaweed of secrecy and let folks see how they swim.

Yours for better statistics about the oil industry—and better use of them by the oil industry.

—Henry D. Ralph.

Again in '60

(the 38th year!)

it's WARREN...

FOR DEPENDABLE DELIVERIES OF

Natural Gasoline

Whatever The Grade, Whatever The Volume

- **WHEN** you want it,
- **WHERE** you want it, and the
- **WAY** you want it!

WARREN

PETROLEUM CORPORATION

TULSA, OKLAHOMA

EXPORT TERMINALS: CORPUS CHRISTI, PORT ARTHUR, BAYTOWN, TEXAS CITY AND WARRENGAS, HOUSTON, TEXAS, SAN PEDRO, CALIF.

You can't extrapolate individual success

THE FIGURES on the oil business in 1959 and the forecasts for 1960 indicate that most divisions of the industry are making substantial progress out of the recession.

Demand is back to what may be considered a normal rate of increase. Crude production is in about the same position. Refinery activity should lag a little until inventories are further reduced. The drilling rate appears ripe for an upturn.

From such statistics the analysts can extrapolate an optimistic forecast of steadily increasing activity and prosperity for the oil business.

THAT'S TOO COMFORTABLE a picture to be realistic. Such projection of trends implies that all that the oil industry has to do is sit tight until an ever-increasing demand floods out all its problems.

That is dangerous thinking. Progress is not inevitable. The future of this or any other industry depends on its ability to give better values.

We say oil is a bargain, and it is. But foreign oil is a better bargain than domestic, and the U.S. industry can't afford to let this discrepancy in values become too great.

Oil's place in the energy picture is being challenged by other fuels. Gas continues to make inroads. Coal is staging a comeback. And new forms of energy and of prime movers await scientific breakthroughs.

In periods of change like the present, it is unwise to forecast solely on the extrapolation of trends. More consideration must be given to causes and effects, to human, political, and scientific factors that could so easily upset any projection of business prospects.

It is particularly fallacious to assume that the trend for the industry as a whole will hold good for any individual unit of the business. It has never been true that good general conditions guarantee the success of an individual enterprise, and it is especially untrue in the period of intense competition facing the oil business.

THE HUMAN ELEMENT carries far more weight in the success of an individual company than in the trend of the industry as a whole. It determines whether an outfit will drift with the trend, rise above it to outstanding success, or sink below it to oblivion.

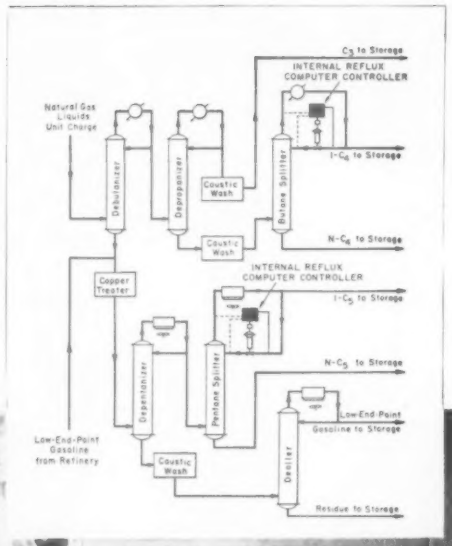
If competition is the life of trade, the oil business should be very lively this year. And those who will get the best livelihood from this condition are those who are most alive to opportunities and most lively in adapting to changing conditions.

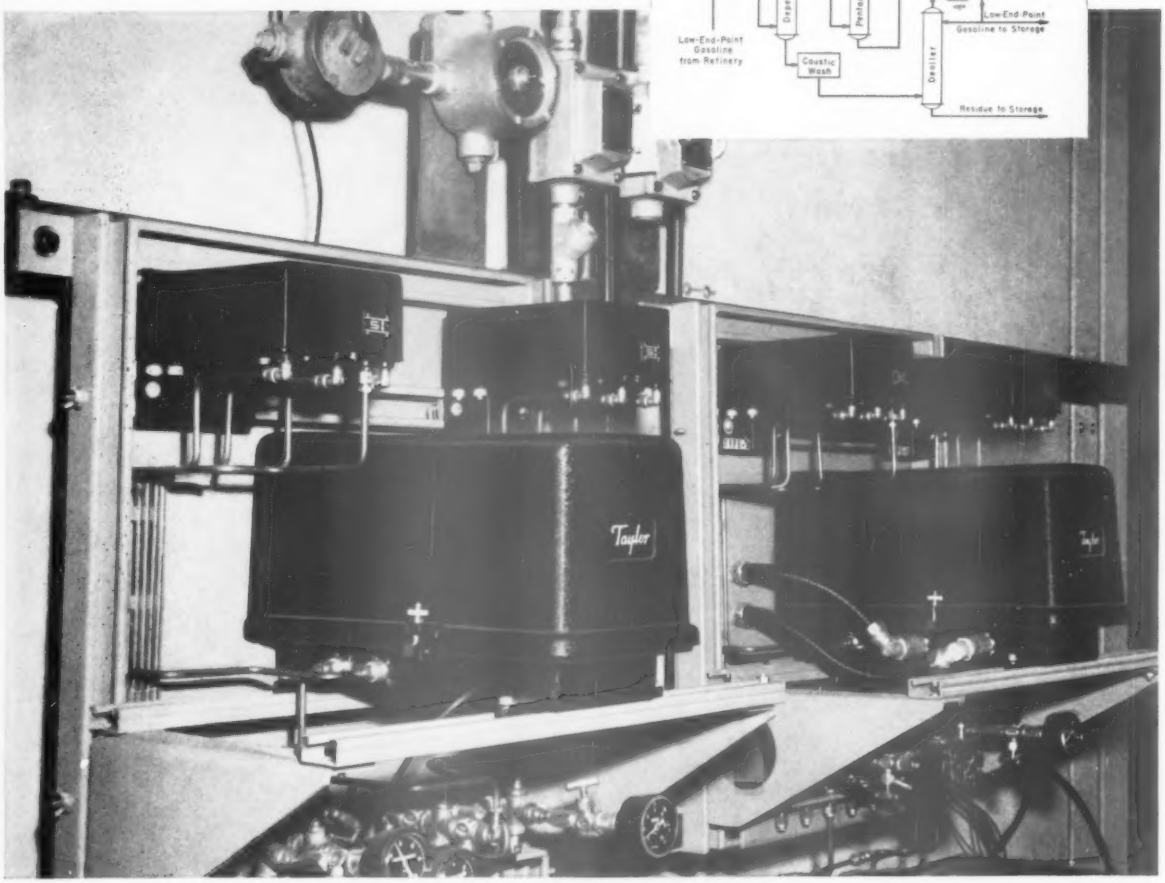
So remember that industry statistics are averages that indicate trends. Your own business won't automatically do as well as the average. But some companies are going to do better than average. Your job is to make your outfit one of those.

MORE PROFIT PER

Drawing at right shows the Taylor Internal Reflux Computer System, installed at Phillips' Sweeny, Texas, Refinery on LP gas fractionation columns. It can be supplied with either pneumatic or electrical output. It fits into any control system already installed—also into any large scale digital or unit analytical computer installation. Set point can be adjusted manually by the operator or automatically from column temperature, process analyzers and/or computers, etc.

Components are all standard, proven units. The Taylor Potentiometer Transmitter permits the use of thermocouples in place of special resistance elements for narrow span differential temperature measurement.





Taylor Computer-Controllers in use on the light ends fractionation system, typical of several systems in use as shown in drawing above.

Taylor Instruments

BARREL OF PRODUCT...

Phillips Petroleum Co. reports optimum fractionator efficiency with Taylor Internal Reflux Computer Control

THE Taylor Internal Reflux Computer Control System consists of the addition of a simple analog computer to a fractionating column. It maintains optimum reflux flow by instantly compensating for climatic effects encountered in outdoor installations. This means:

1. Consistent product quality—no rerunning or blending.
2. Maximum utilization of existing installation.
3. Minimum consumption of steam, air and water.
4. Elimination of flooding—run to design capacity without loss of product.
5. Increased production with no process change. Adaptable to any column design and existing piping and instrumentation.

• • •

Here are Phillips Petroleum Company's answers to questions commonly asked about this system:

Are steam savings effected when using Internal Reflux Computer Controls?

"They minimize reflux adjustments necessary for day and night ambient temperature changes, thereby effecting steam savings. At the same time they contribute to the maintenance of overhead product specifications. A lower reflux ratio obviously saves steam".

Are increased product yields realized by use of computer-controls?

"While it is difficult to pin-point exact increases, we can say they permit continued tower operation at maximum load levels. Without reflux computer-controllers, column operation must be at a less efficient level to reduce hazard of flooding".

Does use of computer-controllers permit use of lower reflux-to-product ratio?

"Yes—particularly when operating to maintain product specifications, such as a minimum of 95% isopentane overhead product. Without computer-controllers it would be necessary to operate at 97% isopentane to insure a minimum 95% product".

Do computer-controllers help meet product specifications?

"Yes—they compensate and 'short-stop' transient column conditions resulting from minor temperature, pressure and feed composition changes. It is no longer necessary to have product samples analyzed in the laboratory to serve as a guide for the operator to make changes in external reflux flow rate".

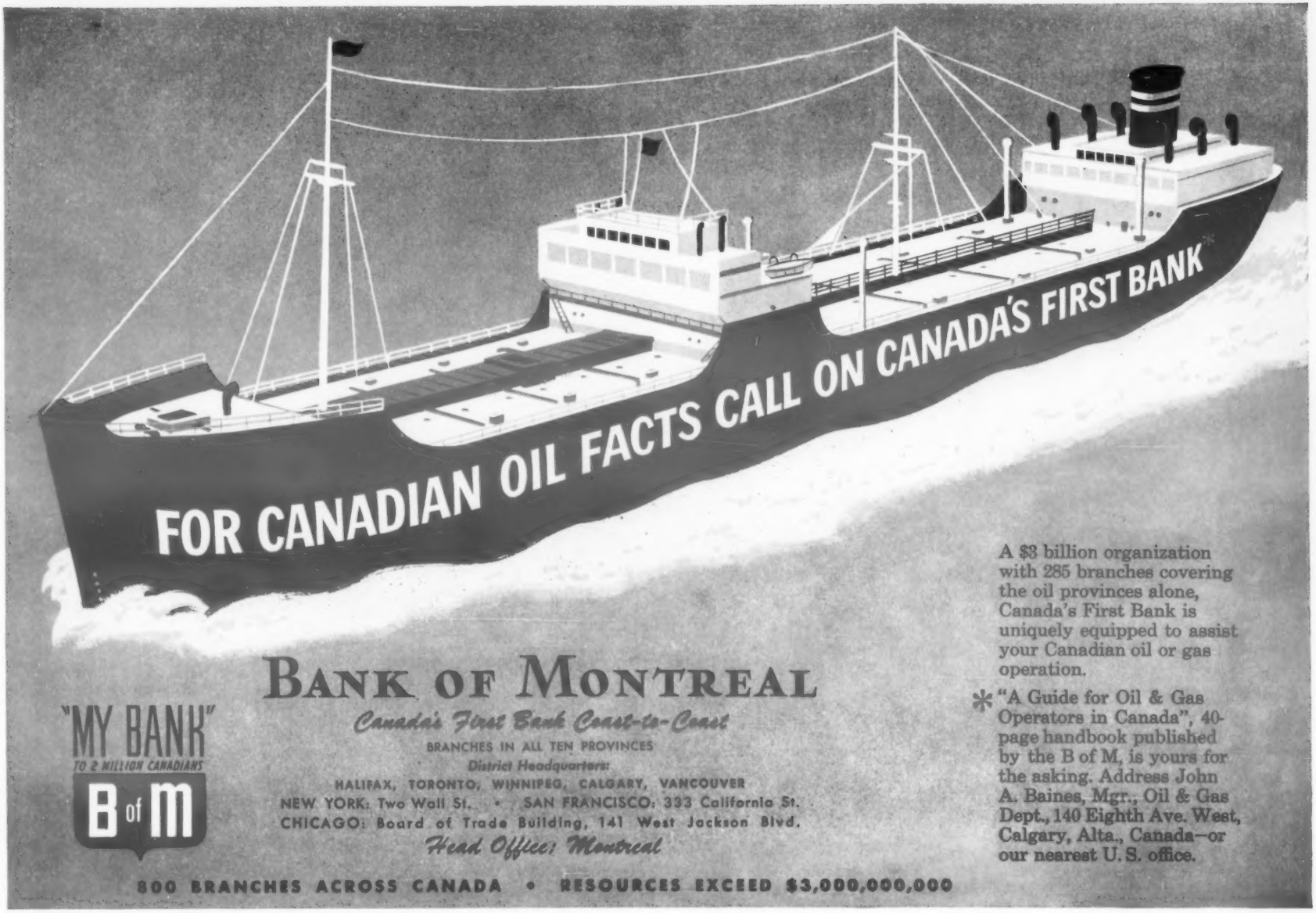
Are plant operators pleased with the performance of computer-controllers?

"They are well pleased with the installations. They appreciate the smoother column operation and ease of meeting product specifications."

• • •

Ask your Taylor Field Engineer for full information about this system, developed and licensed by Phillips Petroleum Company, or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Ontario.

MEAN ACCURACY FIRST



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800 BRANCHES ACROSS CANADA • RESOURCES EXCEED $3,000,000,000

A $3 billion organization with 285 branches covering the oil provinces alone, Canada's First Bank is uniquely equipped to assist your Canadian oil or gas operation.

* "A Guide for Oil & Gas Operators in Canada", 40-page handbook published by the B of M, is yours for the asking. Address John A. Baines, Mgr., Oil & Gas Dept., 140 Eighth Ave. West, Calgary, Alta., Canada—or our nearest U. S. office.

What the "Conspiracy" Trial Involves

• Government hopes to take circumstantial evidence and prove that 29 oil companies rigged the 1957 price increase. Outcome could have a big effect on public opinion, future price adjustments, oil's standing in Washington.

A MAJOR segment of the oil industry will go on trial next week (February 1) in Tulsa. The charge: Conspiracy to raise crude oil and product prices in January 1957.

The case stems from indictments handed down by an Alexandria, Va., federal grand jury in May 1958 charging 29 oil companies with violation of the Sherman Act.

Obviously, the industry has a great deal at stake.

If the companies are found guilty, they face $50,000 criminal penalties. (No prison sentence is possible because no individual is charged.)

Moreover, a guilty verdict would no doubt open the door to other attacks on the industry's traditional pricing practices. In effect, any price move would become suspect.

Perhaps the most severe blow of all would be adverse public reaction. This would make the industry an inviting target for politicians and others wishing to discredit it.

The climate in Washington, often not good in the past, would undoubtedly worsen, encouraging new campaigns against percentage depletion, imports controls, or other measures aimed at helping keep the domestic oil industry healthy and active.

The "conspiracy" case in a nutshell

THE GOVERNMENT is charging that 29 oil companies, including affiliates, conspired illegally to increase the prices of crude oil and refined products in January 1957.

The trial will be held in the U. S. District Court at Tulsa, beginning February 1. U. S. District Judge Royce H. Savage will preside. The trial is expected to last several months.

The prosecution will be handled by a staff of Justice Department attorneys, headed by Joseph McDowell, a veteran antitrust lawyer. For the defense, each company will have its own representation.

The oil firms involved are:

Arkansas Fuel Oil Corp.
Ashland Oil & Refining Co.
Atlantic Refining Co.
Cities Service Co.
Cities Service Co. (Del.)

Continental Oil Co.
DX Sunray Oil Co.
Gulf Oil Corp.
Monsanto Chemical Co.
Ohio Oil Co.

Phillips Petroleum Co.
Shell Oil Co.
Sinclair Oil Corp.
Sinclair Crude Oil Co.
Sinclair Refining Co.

Skelly Oil Co.
Socony Mobil Oil Co., Inc.
Magnolia Petroleum Co.
Standard Oil Co. (Ind.)
Indiana Oil Purchasing Co.

Standard Oil Co. (N. J.)
Carter Oil Co.
Esso Standard Oil Co.
Humble Oil & Refining Co.
Standard Oil Co. (Ohio)

Sohio Petroleum Co.
Sun Oil Co.
Texaco Inc.
Tidewater Oil Co.

Scope is limited . . . Although the current case represents the sharpest legal attack on the domestic industry in recent years, it does not have the breadth and potential impact of such earlier challenges as the Madison case of 1936 or the Mother Hubbard case of 1940.

The current case involves a single pricing action and is not an attack on a pricing or marketing system. It does not charge price leadership or a division of marketing areas.

Should the judge find the companies guilty of the conspiracy charge, he would not outline to them a pricing or marketing pattern that they must follow.

In other words, this suit is an attempt to punish the companies for an alleged wrong. It is not aimed at formulating a new basic structure for the industry.

Weak case . . . Some neutral observers feel that the Government has a long-shot case at best, since it is primarily based on broad circumstantial evidence.

In effect, the Government took a look at the price hikes that occurred in January 1957 and the circumstances surrounding that action and concluded that there must have been some sort of collusion.

There is some grounds to suspect that the Justice Department was somewhat pushed into the case by political pressure resulting from congressional hearings.

There are indications, too, that the Alexandria grand jury may have been reluctant to hand down the indictments in the first place. It is recalled that the jury acted on the final day it was in session.

Those things do not change the fact, however, that the 29 companies

GOVERNMENT prosecutors in the Tulsa trial will be Gordon B. Spivack, left, Joseph E. McDowell, Harry W. Cladouhos, Melvin J. Duvall, Jr., and Theodore F. Craver.

must stand trial, starting next week.

And there is no doubt that the government attorneys will press the suit with vigor.

1. The Government's case

The Government's case has been outlined in a bill of particulars and in a pre-trial brief it submitted to the defendants on January 15.

The companies will submit their basic defense in reply briefs which are to be submitted by February 1.

Basically, what the Government will attempt to prove is that only concerted, "collusive" action by the companies involved could have brought about the price increases in the amount and at the time they occurred.

The Justice Department attorneys will seek to show that the price hikes were not the result of normal supply-demand factors. Instead, they will charge that the companies simply seized upon an opportunity—the Suez crisis—to fatten their profits.

They will charge that this couldn't have happened unless each company had had a good idea of what the other was planning and was willing to go along with the others to make the price hikes stick.

They will seek to weave a web of circumstantial evidence based largely on public statements, telephone calls, and telegrams between officials within a company and contacts between companies before and during the time the increases were being put into effect.

It's circumstantial . . . The Government will make no bones about the fact that its case hinges on circumstantial evidence. That is all that is needed, the Government says.

The government brief cites the following court opinion as an example of the sufficiency of circumstantial evidence:

"Conspiracies by their very nature must generally be established in large part from conversations, admissions, conduct and the natural inferences to be drawn therefrom, and it is sufficient if the circumstances, acts, and conduct of the parties are of such character that the minds of reasonable men can conclude therefrom that an unlawful agreement or understanding exists."

Also, in contending that the oil price hike occurred under "unusual" circumstances, the Government will cite this court opinion:

"Price increases which occur in times of surplus or when the natural expectation would be a general market decline, must be viewed with suspicion."

The government attorneys will keep hammering away at the price hike itself as evidence of collusive action. They will maintain that it isn't essential to prove that the companies "got together" on a price hike plan; the result and not the means used is the important thing.

Working within this broad boundary of antitrust law interpretation, the Government will seek to build its case around the circumstances leading to the price hike, the price hike action, and the part played by each of the defendants.

2. Government "evidence"

Government attorneys will use as the foundation block of their "evidence of conspiracy" the undisputed fact that oil prices rose in January 1957.

They will point out that each defendant engaged in purchasing crude oil increased its posted crude oil prices at that time.

They will show that each of the indicted companies engaged in marketing gasoline also raised its prices —without waiting for the impact of the crude price hike to reach the product stage.

And—this is a point they will stress —the price increases "were made in the face of ample crude supplies and excessive stocks of gasoline."

Finally, they will seek to show that the price hikes weren't made to increase the flow of oil to Europe or for any reason other than to increase their profits.

Stocks adequate . . . The Government will contend that the companies themselves are on record as saying that crude stocks were adequate.

It will produce testimony presented to the Texas Railroad Commission in March of 1956 in which the companies estimated adequate stock levels for November 1. The average of those estimates: 264-million barrels. The actual level on October 27, 1956, was 283.6-million barrels.

"Phony" reasons . . . Having proved to its own satisfaction that stock levels were adequate, the Government will

seek to show that the companies used "phony" justifications for the price hikes.

One common company justification was that the sharp increase in demand after the Suez shutdown put an upward economic pressure on crude prices and that it was necessary to raise prices in order to get the crude to supply Europe's needs.

The Government will attack such reasoning with this type of rebuttal:

The only shortage of crude during the crisis was at Gulf Coast loading points. Hiking the price wouldn't help relieve this situation because it was created by a lack of adequate pipeline transportation from the inland producing areas.

Furthermore, Humble's argument that it initiated the crude price hike in order to buy more crude is "fallacious," because if other buyers raised their prices a similar amount, Humble would be no better off than before.

Finally, because the production of crude is regulated in some states, including Texas, a price hike wouldn't provide more crude "unless state authorities increased allowables."

3. "Concerted Action"

The Government will seek to show that the companies carefully set the stage for a price increase, and that no one moved until there was a "general understanding" that the others would follow.

Here, according to the Government, is the way it worked:

"Talk" of the need for a price hike was started in the industry as early as the spring of 1956 and was continued through the summer and fall.

The chief executives of some of the companies made public statements "in which they invited joint action and indicated their readiness to participate."

According to the Justice Department theory, this created an understanding that there would be a general price hike.

What held this action back, however, was the lack of a "peg" to tie the price hike to. Then the Suez crisis developed and the industry had its peg. Then the planning began in real earnest, and in detail.

With the stage thus set, the Government claims, M. J. Rathbone of Standard Oil Co. (N.J.) made a public statement on December 6, 1956, in which he noted that a general price increase appeared imminent.

Then L. F. McCollum, president of Continental Oil Co., issued a press release on December 16 "stating that crude oil price advances might soon be realized."

Subpoenas Issued for 29 Witnesses

THE GOVERNMENT last week trimmed its list of witnesses from 72 to 29 and issued subpoenas. Here are the 29, with job titles and company affiliation at the time of the alleged conspiracy in 1957:

C. J. Allen, executive vice president, Sinclair Refining Co.
H. P. Arbuckle, Gulf Oil Corp., Pittsburgh.
Wallace E. Avery, secretary, Texaco.
Hines H. Baker, president, Humble Oil & Refining Co.
F. W. Bartlett, director of production, Socony Mobil Oil Co., Inc.
J. E. Brewster, Louisiana-Arkansas division manager, Stanolind Oil Purchasing Co.
P. H. DuVal, vice president, Arkansas Fuel Oil Corp.
A. J. Ferguson, manager of crude oil purchasing, Esso Standard Oil Co., Shreveport.
George W. Goad, manager of crude oil department, central and southern divisions, Tidewater Oil Co., Houston.
E. J. Henry, Jr., director of southwest division, crude oil purchases and sales department, Atlantic Refining Co., Dallas
Eugene Holman, chairman, Standard Oil Co. (N. J.)
S. C. Hope, president, Esso Standard Oil Co.
J. E. Howell, vice president, Lion Oil Division, Monsanto Chemical Co.
Harry J. Kennedy, vice president, Continental Oil Co.
R. H. Lindsey, division manager, Phillips Petroleum Co., Houston.
L. F. McCollum, president, Continental Oil Co.
A. K. McLanahan, senior clerk, Shell Oil Co., Houston.
C. S. Mitchell, vice president, Cities Service Co.
Erskine A. Owens, manager of crude oil supply and pipeline, Ashland Oil & Refining Co.
Charles A. Perlitz, Jr., chairman of executive committee, Continental Oil Co.
Monroe J. Rathbone, president, Standard Oil Co. (N. J.).
C. E. Spahr, executive vice president, Standard Oil Co. (Ohio) and Sohio Petroleum Co.
P. C. Spencer, president, Sinclair Oil Corp.
H. J. Voorhies, vice president, Esso Standard Oil Co.
B. S. Watson, president, Cities Service Co., and vice president, Arkansas Fuel Oil Corp.
Herbert Willetts, vice president, Socony Mobil Oil Co., Inc.
D. L. Wolfe, executive vice president, Stanolind Oil Purchasing Co.
J. E. Wooley, crude purchases and sales department, Atlantic Refining Co., Dallas.
D. A. Young, president, Sinclair Crude Oil Co.

Such statements "were made with the full knowledge of the statements made by others, and with the expectation that they would be read and considered by officials of other defendants as indications of the general sentiment regarding prices."

The next day, Hines H. Baker, then president of Humble, "had a long telephone conversation with Rathbone."

And, during this mid-December period, there were telephone calls between several top company officials of Continental, Jersey Standard, Cities Service, and others, the Justice Department claims.

It takes for granted that the officials discussed oil prices during these telephone conversations.

The price hike was finally set definitely, the Government says, at a meeting in Louisiana on December 26 between Baker and Rathbone when it was decided that Humble would initiate a crude price hike in January.

4. Company roles

When Humble announced its price move on January 3, the Government says, there was a flurry of calls between companies. Soon, other firms were announcing similar action.

According to the Justice Department, the companies had either had direct prior knowledge of Humble's move or had anticipated that such action was in the works. Therefore, in advance of the price increase, they had made detailed studies and detailed plans so that they were ready to act promptly.

This "concerted action" on the price increase was the final "proof" needed, in the eyes of the government lawyers, that a conspiracy existed, and that without it any price hike action would have failed.

It is along such lines that the Justice Department will seek to build its case in the months ahead in Tulsa.

More Gas Pipeline Muscle per Dollar

- Trunkline has come up with a new idea in gas-turbine compressor stations.

The company claims its experimental gas-turbine will save money three ways: In construction, in operating expenses, in cost-of-service per horsepower.

Experimental Gas-Turbine Station May be Economy Champ

	8,000-hp. 2-cycle recip.	8,000-hp. 4-cycle recip.	6,350-hp. conventional gas-turbine centrif.	8,600-hp. experimental gas turbine centrif.
INSTALLATION COSTS				
Buildings and improvements	$ 456,000	$ 374,000	$ 303,000	$ 145,000
Compressors and accessories	1,037,000	1,231,000	1,155,000	840,000
Equipment	315,000	220,000	215,000	192,000
Yard piping	345,000	380,000	258,000	247,000
Other facilities	188,000	190,000	182,000	90,000
Subtotal	$2,341,000	$2,395,000	$2,113,000	$1,514,000
Engineering and administrative expense @ 6%	140,000	144,000	127,000	91,000
Subtotal	2,481,000	2,539,000	2,240,000	1,605,000
Contingencies @ 6%	149,000	152,000	134,000	96,000
Grand total	$2,630,000	$2,691,000	$2,374,000	$1,701,000
Cost of site	10,000	10,000	10,000	10,000
Total plant investment including site	$2,640,000	$2,701,000	$2,384,000	$1,711,000
Cost installed/hp.	330	338	375	199
COST OF SERVICE				
Operating expense	$ 242,720	$ 217,360	$ 192,796	$ 242,864
Depreciation	92,050	94,185	83,090	59,535
Taxes: Federal income	100,056	102,368	90,354	64,847
Other	34,320	35,113	30,992	22,243
Return @ 6¾%	178,200	182,318	160,920	115,493
Total cost of service	$ 647,346	$ 631,344	$ 558,152	$ 504,892
Operating expense/installed hp.	30.34	27.17	30.39	28.24
Cost of service/installed hp.	80.92	78.92	87.90	58.71

Data: Trunkline Gas Co.

Gene T. Kinney
Assistant Pipeline Editor

HOW TO CUT capital costs is one of the most critical problems facing the petroleum industry.

A significant contribution to this goal will be realized in gas transmission if an experiment planned this year by Trunkline Gas Co. is successful.

Trunkline proposes to achieve a sharp reduction in compressor-station costs with two small, lightweight, ultrahigh-speed gas turbines operating in the 20,000-r.p.m. range. Neither type has been proved in gas-transmission service.

The purpose of the experimental installation, for which Federal Power Commission authority is being sought, is to find out whether either or both will work out as expected. FPC approval for the 1-year trial is virtually certain, for the goal is clearly in the public interest.

If either machine comes through, Trunkline forecasts two results:

. . . **Much greater use** of gas turbines, which already are becoming an important factor as a driver of centrifugal compressors on long gas lines.

. . . **Reduced capital cost** of installed horsepower which will enable pipelines more economically to expand by building low-cost boosters between existing stations.

The savings . . . The extent of the savings possible is readily seen from the table on comparative costs.

Trunkline, in its FPC application, compares the costs of stations of three types—two-cycle reciprocating, four-cycle reciprocating, and large single-unit gas-turbine centrifugal—with a station powered by eight of the smaller experimental gas turbines.

If estimates are confirmed in operation, the new type of turbine station will be substantially cheaper both on the basis of construction costs and cost of service than any of the other types.

The advantage is most evident in construction cost per installed horsepower. The experimental installation is cheaper by 39.7% than the two-

cycle station, the dominant type of the industry.

The edge over the 6,350-hp. conventional turbine station with which it is compared is even greater.

In the acid test provided by cost of service per horsepower, the new station's over-all margin is shown. It is cheaper by 27.4% than the two-cycle type, against which any new installation must be measured to check whether it is competitive.

Experimental units . . . Trunkline will install two gas-turbine-driven centrifugal compressors at its Station 31, which now has three 2,000-hp. four-cycle internal-combustion engines directly connected to reciprocating angle compressors.

One will be a 1,075-hp. gas turbine, the T-1,000, directly coupled to a double-shaft centrifugal compressor. Both components will be manufactured by Solar Aircraft Co. This is the unit on which the cost comparison was based.

The turbine is an industrial model whose design results from Solar's experience in supplying some 2,000 units to the armed services since 1945. The compressor is of a unique design. It has a single barrel in conjunction with various standard diaphragms, impeller wheels, and inlet guide vanes to permit a range of compression ratios from 1.1 to 3.5.

The other turbine will be General Electric Co.'s 825-hp. T-58 borrowed from its service as a helicopter drive. It will drive a DeLaval double-shaft centrifugal compressor.

A waste-heat recovery expander turbine, designed by Solar, will be installed. It can be used with either unit, increasing the output of the Solar unit by 425 hp. and the GE unit by 325 hp. The thermal efficiency of each machine can thus be raised to a very respectable 30.5% from the normal 22%.

The new station would cost $580,000. The two principal costs would be $421,000 for the turbine and compressors and $116,000 for the waste-heat recovery system.

Small-turbine breakthrough . . . There is not a single small gas turbine-compressor unit in natural-gas transmission service at this time.

Although some companies have successfully sought economy and control simplicity through large units (OGJ, Apr. 27, 1959, p. 96), the fact that small units have not been available has limited gas-turbine use. Success of one of the proposed turbines could sharply alter this picture.

With an economical small unit offering a wide range of flexibility, increased use could be made of this type of drive.

Trunkline points out that the smaller units will result in smaller compressor stations and lighter station foundations which save money. They lend themselves readily to remote control and applications in remote areas. Entire units can be substituted temporarily to permit major repairs and routine overhauls in a central shop.

If the experiment doesn't pan out, Trunkline stands to recover a substantial part of its investment, as most of the pipe and fittings used in the test can be salvaged at near full value. Certain equipment components can probably be recovered also.

So the potential benefits, to Trunkline and the industry as a whole, far outweigh the risks involved.

Shell Seeks First 320-Acre Oil Spacing

NORTH DAKOTA'S Rough Rider field may be first in the U. S. to have 320-acre spacing for primary recovery of oil.

Request for the wide pattern was made at the January hearing of the state industrial commission by Shell Oil Co. The commission is expected to approve the request.

Shell and Northern Pacific Railway opened the field in December with their rank wildcat, the 32-15 in Section 15-145n-101w in southern McKenzie County (OGJ, Dec. 14, 1959, p. 121).

The discovery, some 35 miles southwest of Nesson anticline production, is in the middle of the North Dakota badlands.

This is a major reason why the industrial commission is expected to make a favorable judgment: Badlands drilling is expensive and difficult.

Dr. Wilson M. Laird, state geologist and adviser to the industrial commission, praised the wide pattern as another forward step in a state whose oil conservation practices already are considered a model for the industry.

There is no 320-acre spacing for oil in the United States at present. The Silurian pay in North Dakota's Beaver Lodge field is under 320-acre spacing, but this is a condensate pay and has been shut in since discovery.

Only other 320-acre oil spacing in North America is in some of the "moose pasture" areas of Pembina field in Alberta.

Hunt Oil Co. has a 320-acre application pending. It asked for the wide spacing in October for an area west of Tioga field in Williams County. The commission denied the request. The case comes up for rehearing next month.

Shell's reasons . . . Appearing for Shell at the commission hearing were John E. Tuttle, production geologist from Billings, and Olin Reynolds, Denver. Tuttle listed several reasons for asking 320-acre spacing in the one-well field:

. . . The ability of each well in the field, because of gas-expansion drive, to drain a large area.

. . . More rapid development of the reservoir than closer spacing would allow.

. . . Protection of correlative rights, elimination of wasteful drilling, and preservation of sound conservation practices.

. . . Hastening of future building of a pipeline gathering system in the area or of a line to tie in with the Butte Pipeline at Glendive, Mont., about 150 miles west.

Reynolds said the cost of trucking crude from the well to Glendive is extremely high—$1.30 or $1.40 a barrel.

Concurring in Shell's request were Texaco Inc., Sinclair Oil & Gas Co., and Hunt Oil Co., leaseholders in the area.

The wildcat, hailed as the most important North Dakota discovery in years, initially was completed for 1,526 bbl. of oil a day, flowing through a half-inch choke on a 6-hour test.

At the industrial commission hearing, Laird reprimanded Shell for its completion methods.

"Personally," he said, "I don't look with favor on short-term tests of this kind." Laird said he preferred a more accurate 24-hour gage.

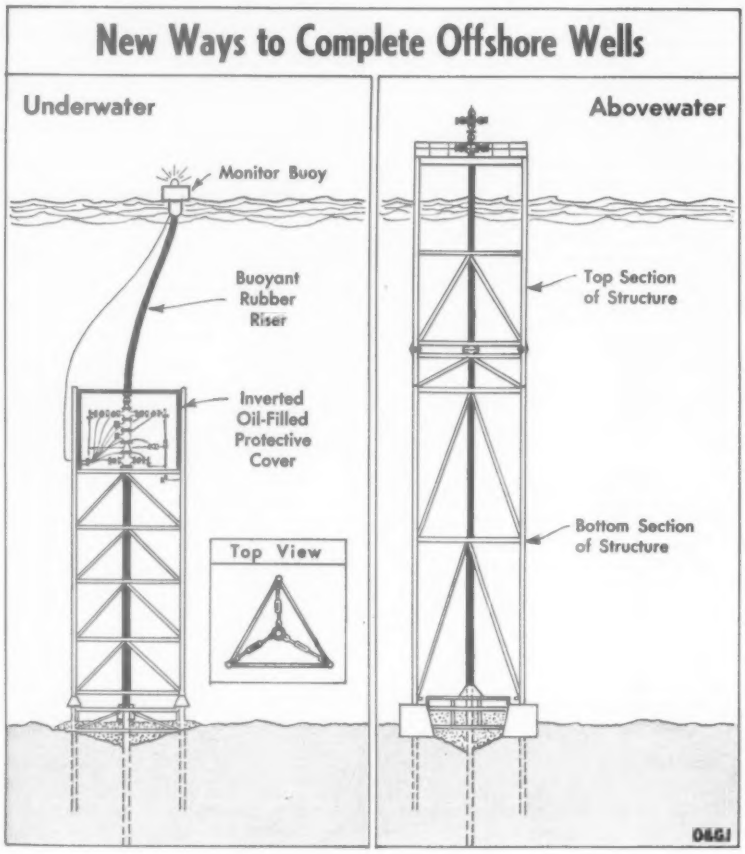
On a 24-hour test January 9 the 32-15 flowed 341 bbl. of oil and 24 bbl. of water (a 7% cut) through a 12/64-in. choke. Production is from the Mission Canyon. Total depth is 9,535 ft.

Gov. John E. Davis, commission chairman, made it clear that a favorable decision by the industrial commission wouldn't mean 320-acre spacing would become general policy in North Dakota.

But a commission go-ahead on the Rough Rider field would make for easier sledding for Hunt Oil Co. at the February commission hearing.

Drilling Ship Used to Complete Wells

- California firm claims it can drill and complete wells from same vessel in water up to 250 ft. deep.



USING two unusual methods, a Los Angeles contractor now can complete offshore wells from the same floating vessel that drilled them.

Executives of Global Marine Exploration Co. say they can make either underwater or abovewater completions, both from a floating vessel.

Until recently floating vessels have been used only for drilling operations. Completions were done from platforms. But in the future the vessels also may get into the business of completing producing wells.

Underwater . . . Of particular interest is the underwater completion method.

Its principal feature is a wellhead made up of "off-the-shelf" equipment and located 50 to 60 ft. below the ocean's surface. Key valves, choke controls, and gages are contained in a rubber buoy floating on the surface.

The christmas tree may be protected from corrosion by an inverted can filled with an inert fluid, such as diesel fuel. Flow lines can be run along the ocean floor to tankage onshore or on platform.

Global Marine cites several advantages for underwater completions, usable in water up to 250 ft. deep:

. . . Subsea wellheads are so deep they don't have to be designed to avoid being navigational hazards.

They are below the violent wave actions. Corrosion and fouling hazards also are substantially reduced. And with the wellhead only 50-60 ft. below the surface, divers can work effectively for as long as 2 hours.

. . . Economies are realized in both installation and operation when compared to the typical platform.

. . . Well workovers, supply, and maintenance also are less expensive.

Global Marine says it is prepared to engineer individually the completion method to handle any known ocean bottom, environment, or casing program.

The procedure . . . Here's how the underwater operation works:

When a well is ready for completion, a heavy drilling base landed on the ocean floor prior to drilling is anchored in place by piles. The wellhead structure is attached to it. A free standing riser is installed to raise the wellhead level to 50 or 60 ft. below the ocean's surface.

A single flange used on the blowout-preventer installation is also used to install the christmas tree. The change-over operation from blowout preventer to christmas tree is so designed that it can be done in about an hour with a diver.

A series of turnbuckle lateral supports from the wellhead-support structure are used to hold the riser in position when the well is completed. The wellhead support has about the same appearance as a conventional wellhead-protector structure.

Vital valve and choke controls and gages are connected by hose bundle to a 3-by-5-ft. floating monitor buoy on the surface. The monitor buoy is held in place by a large diameter flexible rubber hose attached to the structure.

The buoy, rubber riser, and hose bundle are designed to take any knocks from passing vessels. The buoy could be made sufficiently buoyant to permit the pumper to step out on it while attending to his duties.

The wellhead structure in the illustration can be made from standard 10¾-in. casing with 4-in. casing for bracing.

An average underwater-completion structure using the new method in 100 ft. of water could cost as little as $10,000, exclusive of drilling costs. This compares with some known existing costs of $250,000-plus per well on permanent platforms designed for 20 wells.

The underwater method has one other economic advantage. If drilling isn't successful, the cost of a huge platform isn't lost down the drain. The operator can merely move the drilling vessel to another location and try again.

Abovewater . . . A structure similar to those used for conventional well protectors is used in abovewater completions.

The structure is designed for specific use from floating vessels. A prebuilt wellhead-support structure is

anchored to the ocean floor with its top about 35-50 ft. below the ocean's surface. The interior of the structure is left open to allow for flexibility of the pipe strings while drilling is going on.

When the well is ready for completion, the balance of the structure is attached. The weight of the casing is hung from the bottom section of the drilling structure to give the riser a zero stress factor.

The contractor . . . Global Marine is an independent drilling and engineering firm specializing in offshore work.

Its personnel and equipment formerly were part of the CUSS group (Continental, Union, Shell, Superior) which was active in core drilling in California waters several years ago.

Drilling from floating vessels has been highly successful in California and Peruvian waters. By a careful blend of naval architecture and drilling engineering, West Coast drilling fleet operators have successfully coped with Pacific Ocean wave conditions normally more severe than those encountered in the Gulf of Mexico.

An example is the well-known CUSS 1 drilling vessel of Global Marine. It has drilled more than 200,000 ft. of hole in water depths ranging from 45 to more than 350 ft. with such efficiency its costs often compare favorably with those onshore.

TGT Files Expansion Plans

TENNESSEE GAS Transmission Co. has asked Federal Power Commission approval of a $48-million expansion for Tennessee Gas and its subsidiary, Midwestern Gas Transmission Co.

Facilities which Tennessee Gas proposes to add include 155 miles of 36 and 30-in. line of loops in Ohio, Pennsylvania, and New York; 72 miles of gathering line; and 31,300 additional horsepower at five stations. The new lines and horsepower will add 204 million cubic feet of gas daily required by 50 customers, including Midwestern, for the 1960-61 season.

Midwestern's application to the FPC would add 14,000 additional horsepower to its system and increase capacity by 65 million cubic feet daily.

If the applications are granted, Tennessee Gas's total average-day capacity would rise to 2.8 billion cubic feet. This includes facilities authorized by FPC but not yet built. Peak-day capacity, using underground storage, would rise to 3.2 billion daily. Midwestern's capacity would rise to more than 436 million cubic feet daily.

watching WASHINGTON

Clyde La Motte

• A user tax on inland waterways? . . .

A transportation report the Commerce Department is now readying for submission to the White House contains a recommendation for a user tax on inland waterways.

The result of such a proposal, if eventually adopted, would hike the cost of such transportation, perhaps by as much as 30% in some cases.

The purpose of a waterways tax is to make those who use the rivers defray the cost of keeping them open and usable. The idea is not a new one, but a strong push by the Commerce Department at this time might succeed in getting some such levy through.

It is evident that the current administration is leaning more and more to the theory that the cost of any special program should be met, at least in part, by those who benefit principally. That is why, in the highway program, the tax on gasoline was hiked—and may be hiked again. Waterway users can expect to meet with the same attitude.

• Those coal people don't give up . . .

The coal industry is wasting no time in pressing Congress for action on a coal research project and for a fuels policy study.

The new president of the National Coal Association, Stephen F. Dunn, appeared before a House Committee last week urging adoption of legislation calling for a research and development program.

The coal industry was successful last year in getting a bill passed to establish an independent coal research commission, but President Eisenhower vetoed the bill.

Only slightly dismayed by that setback, the coal interests are back again. Noting that the President vetoed the bill because it would conflict with or detract from coal research by the Department of Interior, the coal people are now urging that the research work be guided by a special office set up in the Department of Interior for that purpose.

The other coal drive—to get Congress to draft a national fuels policy—is also being pushed briskly. The National Coal Policy Conference issued a statement last week in which it predicted that the nation's energy supply would become a real problem "if the present irresponsible exploitation of the fuels market is allowed to continue."

This, of course, is a part of its campaign to get further limitations placed on residual oil imports and to end low-cost off-peak sales of natural gas to industrial users who might otherwise burn coal.

It wouldn't be surprising to see the coal people succeed in one or both of their campaigns.

• FPC will restudy an old problem . . .

The FPC is going to restudy the question of whether a pipeline company should be permitted to use the going field price when evaluating, for rate purposes, its own production.

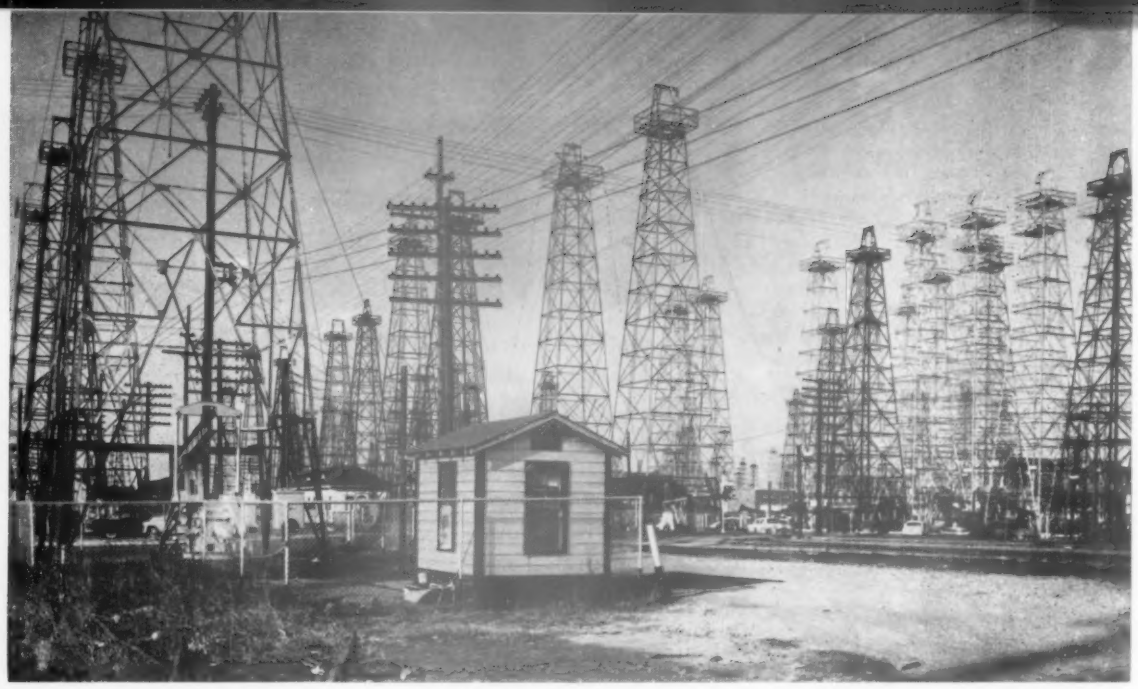
The commission has agreed to reopen proceedings in a case involving Panhandle Eastern Pipeline Co.

An FPC examiner had ruled early last year that Panhandle was not entitled to a higher price than an amount arrived at by application of the conventional rate-base method. So he allowed only the actual cost.

Panhandle asked the commission to reopen the case to take additional evidence on the commodity value issue. Last week the FPC agreed to do so.

The FPC said it wanted to restudy the problem because of the need for providing incentive to pipeline companies to continue gas development. Furthermore, it said it considered the issue of commodity value was important to gas producers as well as to pipeline companies.

It noted that reopening of the Panhandle case would provide it with more information at the time it is considering the precedent-setting Phillips case involving producer prices.



THE FOREST OF DERRICKS in Kilgore, Tex., which is in the heart of East Texas field, is a symbol of the unrestricted drilling during Texas' boom days. Many oil men contend too many wells are still being drilled in Texas even with present conservation laws.

Costs Can Be Cut in Texas, Louisiana

• There is plenty of room to improve the rules governing over half the oil produced in the U. S. In this final part of a two-part Journal study of how to cut costs by improving regulations, the emphasis is on Texas. The Lone Star state is saddled with field rules which often work against conservation and penalize the operator trying to produce more oil from fewer wells.

Robert J. Enright
Dallas District Editor

OPERATORS in Texas and Louisiana say there are many faults in the regulatory systems of the two states.

The biggest faults stem from the allowable systems of the two states. Both encourage drilling unneeded wells to get higher allowables (OGJ, Jan. 18, p. 41). Another big problem in Texas is the small-tract exceptions granted under Rule 37. Under this rule, exceptions to field spacing rules allow drilling on tracts too small to accommodate a rig. Oil men claim this small-tract drilling causes drainage of adjacent large acreages.

Part 2

Probably the next greatest fault in Texas is that the Railroad Commission steadfastly refuses to accept testimony on the economics of an operation—when, in fact, economics is involved in most rules it passes and decisions it makes.

And in Louisiana, operators complain that the commission ignores MER. Reservoir mechanics are always reviewed in Texas hearings when they might have a bearing on the application. But in Louisiana reservoir mechanics are seldom considered. The few such Louisiana hearings which consider MER relate to production of gas and sometimes of gas caps.

1. Added recovery discouraged

Most criticism of the Texas commission's refusal to consider the economics of a project is directed at the discouraging effect such an attitude has on secondary recovery or pressure-maintenance operations.

Special criticism is directed at the commission's refusal to consider economics when unusually expensive programs such as miscible drives are involved.

Company X points out that to install such a high-cost program, an operator must get added allowable. If he can't get a higher production rate, he will not install the program. Oil will be lost, and the cause of conservation not served.

The "present worth" concept, this company says, isn't recognized by the commission.

Here, Company X says, is a case in point.

"We studied one field in which our engineers estimated we could increase recoverable reserves 3.6 times over primary with an artificial drive. But, with no prospects for a substantial hike in allowable, we found that we would merely be stretching out production at existing rates for a period of 200 years. An economic study convinced us that we would actually lose money if we installed the project—despite the huge increase in reserves."

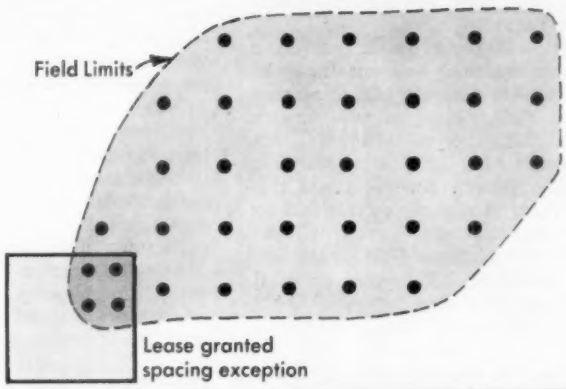
If you manage any increase at all in allowable for such a project, Company X decries, "you have to get it via some back-door route."

The company claims it has postponed or abandoned plans for several such programs—both miscible

"Clustering" wells and adding "scenery" makes problems

One West Texas oil field developed on 40-acre spacing is the victim of a spacing exception which led to 10-acre spacing in one part of the field.

The operator of a 160-acre lease at the field's edge was granted a spacing exception. He drilled four wells in one corner of the lease and let the remaining 120 acres go undeveloped. The result: Four wells where one should be, and a 10-acre pattern in a field with 40-acre spacing.



drives and water-injection projects—due to this situation. And it is certain other operators are in the same boat.

Operator Y says flatly: "We must get more extra allowable for miscible projects because of the heavy extra cost—or we simply can't afford to install them."

2. Inequities among fields

Another major criticism in Texas is that allowable treatment varies from field to field—that multiple standards prevail.

One operator points out that many fields in the state have MER's considerably above the yardstick allowable—some of them far above it. These, it contends, were given such high MER's several years ago when oil demand was high. But now the commission "seems to be regarding the depth-bracket allowable as the ceiling. We're getting turned down despite presentation of a great abundance of supporting evidence. Meanwhile, the big MER's in these older fields are carried right along at the same high levels. Either the new fields should be given higher allowables or the older ones cut back."

Other alleged inequities include:

... **Discrimination** against big fields.

One operator who had studied this situation pointed out that in 1957 East Texas field was permitted to produce only 5% of the state's production though it had 19% of the state's oil reserves. Kelly-Snyder, with about 6.4% of the reserves, was allowed only 1.64% of the production. Van field, with 2% of reserves, produced only .5% of state production. These are a few examples. The company feels these figures would be very nearly true ones still "because, though reserves in these fields have gone down some, so has production."

... **Favored treatment** for old fields. Conversely, some old fields are still operating on potential-type allocation formulas which give them an advantage over those found later. Operators also charge that a great many older fields are not subject to gas-oil ratio and pressure surveys.

... **Exemption** of many fields from proration for what some operators feel are not sound reasons.

The allowable for wells in Texas exempt from shutdown days for one reason or another totaled 1,163,360 bbl. daily as of January 2. This means that while other wells are limited to producing on January's 10-day schedule, the exempt wells will produce their allowables every day.

The great bulk of the exempt allowable is for secondary water floods. And operator opinion is deeply divided as to whether this is wise. Some feel that floods can be prorated without damage to ultimate recovery. They argue that the exempt allowable has grown so large as to seriously hurt production that is not exempt.

Exemptions also are enjoyed by some wells on salt domes or producing large volumes of water, those located in the so-called county regular fields and those designated as marginal under Texas' statutes.

The county regular fields, all in North and West Central Texas, actually are made up of a large cluster of small fields. The county regulars were formed and exempt in 1949 by the commission. There was then little flush production in these areas. And complex geology made administration of individual fields very difficult.

Humble Oil & Refining Co. a few years back fought unsuccessfully to eliminate all exemptions except statutory exemptions for marginal wells.

3. Inequities within fields

Operators in Texas call attention to other inequities within fields other than those having to do with allocation formulas.

The state's marginal-well law is drawing criticism on several counts. Under this law, a pumping well is not prorated after its production falls below a certain volume. This volume is determined according to a depth-bracket formula. An operator can get his well classified as marginal when he is able to show the well cannot produce more than this set volume.

Here's a breakdown on the marginal-well, depth-bracket formula:

Depth	Max. Allowable
0 to 2,000 ft.	10 bbl.
2,000 to 4,000 ft.	20 bbl.
4,000 to 6,000 ft.	25 bbl.
6,000 to 8,000 ft.	30 bbl.
Deeper than 8,000 ft.	35 bbl.

One criticism is that it is too easy to get the marginal status for a well. There is nothing in the statute to require that the well, under test, must produce at its most efficient pumping rate. Thus, many wells enjoying marginal status don't deserve it.

Another criticism is that the marginal allowable is too high in some areas, especially at shallower depths.

The law was passed, its critics point out, when all Texas wells were producing their allowables every day of the month and before it was even conceived that the state would ever be operating on an 8, 9, or 10-day producing schedule. And this has resulted in some "absurd" situations.

One large Southwest operator points up the effect of the law in East Texas field, which produces from about 3,500 ft.

"The marginal-well cut-off point in

East Texas field," a company engineer says, "is 20 bbl. a day. But the top allowable for the better wells in the field also is only slightly over 20 bbl. daily—and these are subject to shutdown days.

"The ridiculous upshot of this is that the marginal well, the least efficient well in the field, gets to produce up to 620 bbl. of oil this month. Meanwhile, the top-allowable well, the field's most efficient, is restricted to only 200 bbl. for the month."

A study carried out by this firm for September last year showed this: Of the 18,937 wells in East Texas field on production, 2,920 were marginal. These marginal wells had 947,379 bbl. of the field's total 4,041,183 bbl. of allowable for that month.

Thus, the marginal wells represented only 15.45% of total producing wells but boasted 23.3% of the field's total allowable!

The study also showed that, if all the wells in East Texas field were given marginal status, production would climb from September's 130,000 bbl. daily to roughly 360,000 bbl. daily.

And for some operators, it estimates, such would mean a production increase in the field of as much as 20,000 to 30,000 bbl. a day.

Few operators are blind. And the temptation to take advantage of this situation is exceedingly strong. Since September, the number of marginal wells in East Texas field has climbed by 76. The total marginal allowable has spiraled accordingly.

Another operator in East Texas field suggests that a marginal-well cutoff point of 6 or 7 bbl. daily would not be too little for this field.

East Texas field is the extreme example of inequities stemming from Texas' marginal-well law, but there are many other lesser ones.

Operators say the law should be amended. They suggest that either the marginal yardstick should be revised to lower cut-off points for shallower depths or that the cut-off points should be fixed on a field-by-field basis.

Well-classification hit . . . Fault is found, too, with the workings of Texas' well classification setup as it is affected by the state's producing-days method of setting oil allowables.

Between the marginal well and the top-allowable well, there is one other category—the limited-capacity well. This is one that cannot make the top allowable for its depth but has not yet sunk to the marginal level.

The criticism is that the commission generally doesn't know now when a well becomes a limited-capacity producer. And it might not find this out until the well becomes marginal.

The practical difference between a top-allowable well and a limited-capacity producer is that the former is allowed to produce this top allowable times the number of producing days for the month. The limited-capacity well is permitted to produce only its daily capability times the number of producing days.

The trouble is that, with only 9 or 10 producing days it is hard to detect that a well has limited capacity.

Take a field where the top allowable is 150 bbl. daily. The top-allowable well on a 10-day producing pattern may produce 1,500 bbl. for the month.

Now take a well in the field which actually is limited capacity and can produce only 80 bbl. a day. If it were known to be limited capacity, it would be allowed only 800 bbl. total for the month. But both this well and the top-allowable well may produce their allowables anytime they wish during the month—producing some oil each calendar day if so desired.

The actual capability of the 80-bbl. limited-capacity well is 2,480 bbl. for a 31-day month—far above the 1,500 bbl. top-allowable figure. It can produce 1,500 bbl. during the month with ease. And it thus is difficult for the commission to detect that it is, in fact, a limited-capacity producer.

Spacing distorted . . . The tiny tract is not the only cause of well-spacing distortion in Texas.

Some operators deplore the ease with which uniform spacing is broken in Texas fields via other exceptions to field rules. The number of such exceptions sought and approved is burgeoning, they contend.

Company X charges that applications for such exceptions now are running about 1,200 to 1,300 a year—and only about 20 are turned down.

This is combining with another factor to contribute to sloppy spacing in the state. This factor is that requirements in a field's rules relating to minimum distances from lease lines and between wells too often bear little resemblance to the proration unit size established by the rules.

Company X admits that Texas has a spacing problem not found in most oil states in that it does not have governmental sections. But it feels it could do much more to achieve more uniform spacing.

No consistency shown . . . One company recently conducted a study of auxiliary lease-line and between-wells distance rules in Districts 1, 2, and 4 in South Texas.

It found 74 gas fields where field rules called for 320-acre proration units. Ideally, if wells on this spacing were located in the center of such units, rules would call for wells being drilled no closer than 1,320 ft. from the lease line and a minimum distance of 3,732 ft. between wells.

Company X found that only two

Forum Endorses Well-Spacing Study

THE TEXAS subcommittee of the Oil Industry Conservation Forum last week endorsed the well-spacing study completed last fall by the West Central Texas Oil and Gas Association.

It thus joined a growing list which also includes the North Texas Oil and Gas Association and the Texas Independent Producers and Royalty Owners Association.

Chairman of the Texas subcommittee, Harold Decker, president of Highland Oil Co., Houston, said the report and its widespread acceptance are evidence the forum is making progress.

The West Central Texas group concluded in its report that no change should be made in Texas' basic spacing rules. It also concluded, however, that acreage should figure more heavily in allocation of production.

It decried drilling on tiny tracts. And it suggested that temporary spacing rules for new fields, to be set following completion of the discovery well, should prove helpful in preventing drilling of many unneeded wells. (OGJ Nov. 30, 1959, p. 54).

Decker made his announcement following a meeting of the Texas subcommittee in Dallas last week.

In it, he also noted that a misconception of the forum's aims had apparently developed within the industry. "It is the purpose of the forum," he said, "to foster and support ideas and procedures which will make it possible to lower the costs of producing oil and gas. One of these ideas is to find ways and means of encouraging proper-sized drilling units in new fields.

"This has been sometimes misconstrued as support of wider spacing in general, which is not the case."

The committee believes, he said, that it can attain its objectives within the framework of present state laws and regulations.

of the 74 fields had rules specifying drilling not less than 1,320 ft. from the lease line. Of the other fields, 30% had a rule calling for 660 ft., 27% called for only 467 ft., and 40% for only 330 ft.

As for the minimum distance between wells, none of the 74 fields had a 3,732-ft. rule. Fifteen fields (20%) specified 2,640 ft. Of the rest, 39 fields (53%) called for 1,320 ft., 18 for 933 ft., and two for only 660 ft.

The study showed the same thing for oil spacing.

Company X counted 125 fields in these districts with rules calling for 40-acre spacing—where center spacing would call for 660 ft. from lease lines and 1,320 ft. between wells.

Only one field had a lease-line rule of 660 ft. Seventy-six fields specified 330 ft. And the rest fell in between.

The great bulk of the fields, 98, called for a minimum distance of only 933 ft. between wells. The remainder had rules ranging all the way from 660 ft. to 1,320 ft.

The easy-to-come-by rules exceptions and the loose-spacing rules in individual fields have several undesirable effects.

One permits clustering of wells. This, in turn, makes for poor patterns when pressure-maintenance or secondary-recovery operations must be started.

A second is that it makes it easy for an operator to add nonproductive acreage or "scenery"—especially on the edges of a field.

Operator X contends Texas is the only producing state in the country with this problem.

4. Agencies, the key

In most instances, the operators say, revamping Texas and Louisiana regulatory systems to eliminate unwise, costly features would not require legislation. It could be done on order of the conservation agencies.

This is true of the prime basic faults—the features that encourage unneeded drilling just for allowable advantage.

No new laws are needed, for instance, to attain allocation based more on acreage or reserves.

Operators urging such basic changes are quick to acknowledge that they and the industry as a whole are responsible in the main for the systems as they exist now. The industry, they say, usually gets what it asks for.

But this doesn't alter the fact, they say, that changes in the systems are vital now to help the U. S. oil industry get back on a competitive footing with its foreign competitors.

New Tool for Drillers

. . . is developed by Southwest Research Institute. It's a percussion jar used to free stuck drill pipe.

A HYDRAULIC percussion jar which operates swiftly and continuously in loosening stuck drill pipe is undergoing tests at Houston.

Southwest Research Institute, San Antonio, has developed the device for Bowen-Itco, Inc., which is making tests at its Houston plant.

The new jar does not have to be recocked for each cycle, Southwest Research says.

"It can be started at any time and will jar upwardly at a fast and continuous rate," the Institute says. Percussion occurs at the rate of several hundred times a minute. Energy of the mud column in the drill string operates the new jar, which consists primarily of a hammer, a case, and a valve.

The tool, for best results, is placed in the drill-collar string directly above the bit. When the bit or drill collars become stuck, operators can activate the jar by dropping the go-devil into the pipe from the surface and pumping it down.

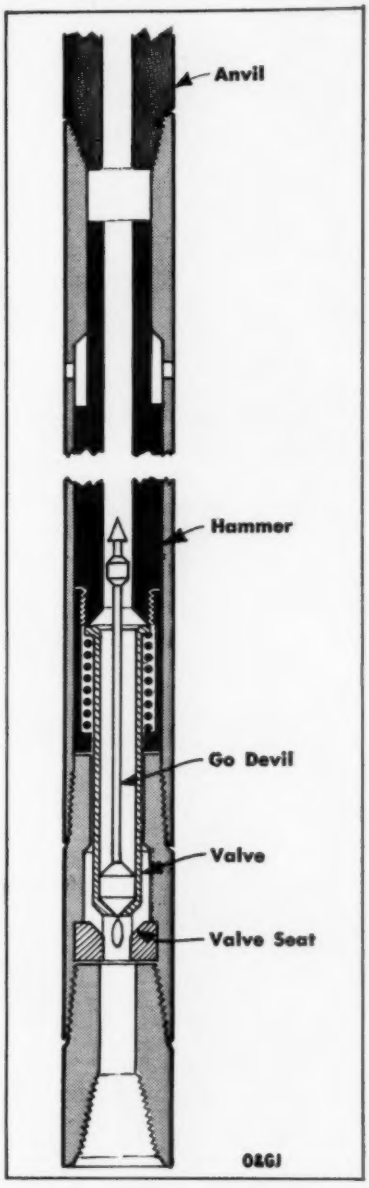
After this occurs, the device, according to the Institute, operates in the following manner:

The plug lands on its seat in the jar and blocks circulation at the central control port. Since the fluid velocity is suddenly brought to zero, a water hammer effect will occur, resulting in a pressure within the tool much greater than that being furnished by the pump at the surface. Since the area of the lower seal on the hammer is greater than the area of the top seal, the pressure build-up will cause the hammer to move upward at a high rate of acceleration.

When the hammer is a short distance from the anvil, the valve will be jerked off its seat by an inward-facing shoulder on the lower end of the hammer. The hammer will then strike the anvil. At this time, the valve spring has reached its fullest degree of compression and will immediately start raising the valve, allowing circulation to be resumed.

As the valve approaches its full open position, the fluid velocity through the hammer increases, causing the pressure drop across the hammer to increase. The hammer rebounds off the anvil, and the pressure drop acting on the area of the top seal serves to return the hammer.

As the valve approaches its seat, it will snap shut, stopping fluid flow and causing excess pressure. This action decelerates the hammer, reverses it, and starts a new cycle.



Once the pipe is free, free circulation can be reestablished by going in with a wire line and overshot, and bringing the go devil back to the surface. The go devil also may be circulated out by reverse circulation.

The jar has not been field tested and probably will not be ready for marketing before September. Tests are now being made in a 300-ft. hole at Bowen-Itco.

How Oil Views Ike's Budget Proposals

• Big disappointment: No mention by President of natural-gas bill. Some other suggestions—particularly a boost in gasoline tax—are stirring up industry protests. Many of his proposals are in for some rough sledding.

THE OIL industry is finding little to cheer about in President Eisenhower's budget proposals affecting oil. Segments of the industry are already protesting some of the recommendations.

These are some of the President's proposals which would affect the oil industry directly or indirectly:

... **Increased** tax on gasoline and avgas, plus a new tax on jet fuel.

... **A continuation** of the 52% corporate tax rate.

... **Higher fees** on noncompetitive federal oil leases.

... **An increase** in postal rates.

... **Postponement** of the elimination of the 10% tax on local telephone calls, and a delay in the planned reduction in the tax on passenger rail travel.

Aside from taxes, the President also made some legislative proposals which will draw fire from some oil people.

For example, he approves of the plan to require large corporations to file notice of intentions to merge, and he wants the Federal Trade Commission to have the power to seek preliminary injunctions in merger cases.

Too, he would give the Justice Department the authority to demand corporate records for civil antitrust action.

He wants the minimum wage law extended to retail and service trades (but kept at the present $1 minimum).

One of the industry's biggest disappointments was in what the President did not propose. He said nothing in his budget message about a natural-gas bill.

This does not close the door to a later request, but it does indicate that the administration is not likely to give legislation the real push which the industry feels would be required to win passage this year.

Brighter side . . . The President did make some recommendations which will find favor with at least a part of the industry.

He favors legislation to encourage investments abroad by deferring U. S. taxes on incomes of U. S. companies operating overseas. However, the President would limit this benefit to operations in underdeveloped countries.

He advocates higher depreciation rates for industry and business, but this advantage would be offset to a considerable extent by a proposed requirement that a straight income tax, rather than a capital gains tax, be paid on any profit made from the sale of used equipment.

He suggested that cooperatives should have to pay more taxes.

Tough sledding . . . Just how many of Eisenhower's proposals will meet with congressional approval remains to be seen. Right now, it would appear the President faces an uphill fight on many of them.

The tax proposal which will draw the most fire is the recommended increase in taxes on fuels.

Sharp criticism already has been voiced of the proposal to hike the federal tax on gasoline another ½ cent a gallon, together with a hike in the avgas tax (now 2 cents) to 4½ cents, and the levying of a 4½-cent-a-gallon tax on jet fuel, which is now untaxed.

There is particular anger over the motor-gasoline tax, not only because of the proposed boost but because the President has recommended that the tax be continued through June 1964.

When Congress passed a 1-cent increase last fall, it specified that the increase would apply only until July 1, 1961.

The American Petroleum Institute filed an immediate and vigorous protest, urging Congress to stick by its pledge to end the 1-cent increase next year as planned.

The American Automobile Association also protested, and suggested that motorists let Congress know their views. The AAA pointed out that a 4½-cent federal tax, coupled with state gasoline taxes, would mean that out of each dollar the motorist spends on gasoline, about 33 cents would be on taxes.

Several congressional leaders, particularly among the Democrats, have said they will oppose the hike. It should be borne in mind, however, that they also opposed the increase last year.

President Eisenhower
. . . seeks more tax money from oil.

There is a possibility that the gasoline-tax hike will be made a political issue during the summer, with the administration charging "fiscal irresponsibility" to those who oppose the increase. On the other hand, the Democrats may seek to enlist public support in a campaign against the tax hike.

What to expect . . . Of Eisenhower's other proposals, it appears virtually certain that the 52% corporate tax will be extended, and it is a good bet that fees on federal leases will be hiked.

The proposal to hike postal rates probably will be shelved, but the President is likely to get his way on the extension of the telephone and transportation taxes.

The recommendations on mergers probably will not be adopted this year, nor is any action likely to be taken on depreciation rates.

The question of tax incentive for overseas operations may be settled soon, since Congress already has it under consideration. At this point, its chances of passage are only fair.

All in all, the action to be taken by Congress this year is likely to hinge to a considerable extent on economic conditions. If the faster economic pace anticipated by the President brings in the required tax revenues, there will probably be little, if any, tampering with the tax structure or with major regulatory practices.

However, if there is a decline, Eisenhower's program will undergo increasing attack.

Flexible Plastic-Steel Pipeline Approved

- Line will run under Strait of Georgia to Vancouver Island. Pipe is layers of plastic wrapped around plastic core. It's reinforced with steel bands.

A $14-MILLION submarine pipeline system using flexible pipes to span 720-ft. depths to bring natural gas from the Canadian mainland to Vancouver Island has been approved by the British Columbia cabinet.

Magna Pipeline Co., Ltd., proposes to install the system. Construction must be completed by June 30, 1962, under the order of the Public Utilities Commission certificate of public convenience and necessity approved by the cabinet.

British Columbia Electric Co. plans to spend $11 million to install a distribution system to serve the greater Victoria area. Magna proposes to buy gas from British Columbia Electric on the mainland at Huntington, near Vancouver, which the utility also supplies.

Certificate battle . . . Magna won the right to build the pipeline over Island Transmission Co., Ltd., of Nanaimo, Vancouver Island, which had proposed a conventional welded-steel system to cost $16 million.

The PUC directed Magna to complete its contract for flexible pipe from a British supplier before May 1 this year. The tentative timetable calls for work to start by the spring of 1961.

However, Island Transmission hasn't given up in its bid to construct the project. It has appealed for a rehearing on grounds there are serious defects in the Magna project. Island contends that Magna has failed to obtain firm contracts for gas, has underestimated costs by ignoring compressor stations, and is basing the entire project on a flexible plastic pipe that is unproved. Island's arguments are supported by Collins Construction Co., Port Lavaca, Tex., submarine pipeline specialists hired as consultants.

Both companies propose to deliver 30,000,000 cu. ft. daily to Vancouver Island.

Contrasting methods . . . Magna proposes to install lines from the mainland across some 25 miles of the Strait of Georgia. The flexible pipe would be reeled off a cable ship and lowered to the bottom. This is similar to the wartime products lines through which the Allies pu. ed products from England to France across the English Channel.

The pipe consists of several layers of plastic material wrapped around a plastic core which is reinforced with spiral steel bands. The inside diameter is 4.85 in. The material is supposed to be capable of withstanding pressures up to 3,000 psi.

Island's approach to this ticklish construction problem is the same as Collins Construction has used in other projects. Collins would install twin 10-in. welded-steel lines using its "friction transposition" method.

The lines would be pulled from shore along the bottom. They would be buried in shallow water near either shore and left on the bottom in deep water. The twin lines would provide for security against a break and for capacity to handle increased demand.

INDUSTRY BRIEFS . . .

Standard Oil Co. (Ohio) has abandoned plans to acquire Leonard Refineries, Inc., a Michigan refining and marketing company. The Government had moved to stop the merger by court action, and Sohio decided the legal process of clearing the deal would take too long to be practical.

A county-option plan to require motorists to install smog-arresting devices on vehicles has been approved by a special subcommittee of the California Legislature. The bill, which will be considered at a special session in March, also would set up a state laboratory for testing antismog devices and create another board to approve devices and make vehicle exemptions. Vehicles failing to comply would be denied registration.

Texaco will triple the size of a 100,000-bbl. butane storage well in Sour Lake field, Hardin County, Texas. Texaco will leach out the underground cavity in the salt dome to bring it to a 300,000-bbl. capacity. The company has three other storage wells in the field, one of 300,000-bbl. capacity and two others of 100,000-bbl. capacity. Texaco uses the stored butane for its Port Arthur works, located 45 miles to the east.

Continental will spend $2 million as the operator of a water flood in Cat Creek field in Petroleum County, Montana. Conoco hopes to increase recovery from the Kotenai sands in the 40-year-old field from 150 bbl. daily to 2,000 bbl. daily. A small pilot flood has operated in the field for 2 years. The area to be unitized for the project consists of 1,240 acres on the west and main domes of the field, located 20 miles east of the town of Winnett.

The first court test of Wyoming's special 5-mill high school tax levy has been postponed until March 10. District Court in Sweetwater County has issued a temporary restraining order against collection of the tax until that date. The case will be heard by Judge Glen Stanton. Sinclair Oil & Gas Co. filed the suit, which requests a permanent injunction against the tax, declaring it unconstitutional.

Tennessee Gas Transmission will construct a building at Lafayette, La., to house expanding operations of three divisions. The company has contracted to buy a 74,000-sq.-ft. tract in Lafayette's Oil Center. Size of the building and the number of employes to work there have not been announced. South Louisiana offices of Tennessee Gas Pipeline Co., Bay Petroleum Co., and Tennessee Gas & Oil Co. will be located in the building. The pipeline division established temporary operating divison headquarters at Houma, La., on January 1, and these will move to Lafayette.

A new edition of Petroleum Facts & Figures, the most comprehensive and all-inclusive statistical volume on petroleum to be issued since 1948, is being published by the American Petroleum Institute. It includes data on production, refining, transportation marketing, and utilization. It also incorporates historical highlights on each of the industry's major divisions, a bibliography, and a glossary of key oil terms. All members will receive a copy. Additional copies are available at $4.50 each.

What Producers Pay Out and Receive

(All figures in millions of dollars)

	PREVIOUS SURVEY			PRESENT SURVEY	
	1944	1948	1953	1955	1956
EXPENDITURES:					
Exploration					
Dry Holes	274	462	797	774	909
Lease Acquisition				651	561
Geological & Geophysical	327	570	987	306	360
Other				263	287
Total	601	1,032	1,784	1,994	2,117
Development					
Producing Wells	593	1,058	1,762	1,826	1,959
Equipment	203	362	483	426	477
Total	796	1,420	2,245	2,252	2,436
Production					
Production Taxes				258	278
Ad Valorem Taxes				166	169
Other				1,183	1,331
Total	566	1,097	1,846	1,607	1,778
Overhead					
Exploration	44	79	172	189	208
Development	55	98	174	197	212
Production	61	115	227	232	252
Total	160	292	573	618	672
Total Expenditures*	**2,123**	**3,841**	**6,448**	**6,471**	**7,003**
RECEIPTS:					
Oil and Gas Production	1,909	4,805	6,132	6,671	7,095
Other Lease Revenue	9	13	20	23	24
Royalty Payments Received	93	226	319	178	201
Total Receipts	**2,011**	**5,044**	**6,471**	**6,872**	**7,320**

*Excludes federal, state, and local income taxes, interest payments, and returns to investors.

Spending Tops Income

. . . joint study of 1956 oil and gas producing operations shows. Development, alone, took a third of all receipts.

TOTAL outlays of the domestic oil and gas producing industry still exceed income from production.

This shortage demonstrates why oil producers still must attract into their business new funds from other sources. That is the only way they can replace production and prepare for increases in demands of consumers.

A new study of expenditures and income of producers for the years 1955 and 1956 shows this relationship clearly. Participating in the study were the American Petroleum Institute, the Independent Petroleum Association of America, and the Mid-Continent Oil and Gas Association. The same groups made similar studies in 1944, 1948, and 1953.

Big spenders . . . The new survey found that expenditures by oil and gas producers mounted to $7 billion in 1956 (See table).

This is an increase over 1955 of 8% and an 80% gain since 1948.

The 1956 expenditures, however, amounted to 95% of the $7.32 billion total receipts.

The spending did not include substantial amounts paid out for income taxes, interest, and returns to investors. Had these also been taken into account, the outlays of the domestic oil and gas producing industry would have exceeded income. This means the industry balanced its spending to income by borrowing or returning profits to the business.

A steady growth . . . Other important economic facts were also revealed by the survey. It showed that:

. . . **Expenditures** by producers have made a steady upward climb since 1944, when they totaled $2.1 billion.

. . . **The outlay** for exploration and development, including applicable overhead, has exceeded 67% of total receipts since 1953.

The cost study also showed that development expenditures constitute the largest single division. They totaled $2.4 billion in 1956 while exploration costs were $2.1 billion and production outlays $1.7 billion.

The 1956 production costs appear to be sharply below those of 1953, but the two are not entirely comparable. A change was made in estimating techniques of the 1956 survey because additional data was available.

In the latest survey, production costs were analyzed in relation to value of oil and gas production. In the earlier ones these had to be estimated on basis of crude-oil production alone since information was not collected on gas production. The decrease in 1956 spending consequently reflects the difference in information and does not mean a decline occurred.

OCDM Study Slated

. . . of proposal that 50% of imports be hauled by U. S.-flag tankers.

A DECISION by the Office of Civil and Defense Mobilization to study the impact of the oil import-control program on the U. S.-flag tanker fleet may delay a push for congressional action on the tanker problem.

At stake is an effort by some operators of U. S.-flag tankers to get a government regulation requiring that 50% of oil imports be brought in by U. S. flag vessels.

In announcing that it would make the investigation to determine whether national security is affected, OCDM invited all interested parties to submit comments. Other government agencies, including Commerce, State, Defense and Interior departments, are also being asked to submit their views.

It is likely that the OCDM study will take several months. The Joint Committee for American-Flag Tankers and the Committee of American Tanker Owners, Inc., had petitioned the OCDM for a hearing.

Their argument is that unless the 50% program is adopted, U. S.-flag tankers will be forced out of business because they can not compete with tankers under other flags.

They are being opposed by international oil firms and others who have some or all of their tankers registered under foreign flags.

They argue, too, that they have already been hurt by the imposition of oil-import controls.

Pipe-Grinding Machine Gets Successful Test

• Electric-powered device restores damaged pipe ends in the field.

A NEW device that offers a solution to the long-standing problem of getting smooth surfaces on pipe ends in the field has been tested at Houston with good results.

Called an End Grinding Machine, it was used recently to restore pipe ends damaged in shipment. The contractor, Atlas Pipe, Inc., Houston, said the machine "does exactly what they said it would do."

The electric-powered machine (photo) fits inside the pipe end with a spindle on center outside. It rotates around the spindle and brings the grinding wheel into 30° parallel alignment with the bevel. A spring on the spindle forces the grinder against the work.

Once the 30° bevel is completed, the operator can then put the machine in another dimension for a flat-face aligning.

Workmen on the project said they could complete a pipe end in 15 to 30 seconds. The work was done on 10¾-inch German line pipe for Gulf Oil Corp. The pipe had been damaged in transit.

Basic use of the machine, however, will be in the field for providing a smooth surface for any torch bevel and eliminating feather edges.

AUTOMATIC-ELECTRIC-driven grinding machine smooths and puts lands on pipe bevels damaged in shipment, will handle diameters up to 26-in.

H & M Pipe Beveling Machine Co., Tulsa, developed the machine and is marketing it.

PROCESSING BRIEFS . . .

Dow Chemical will increase polyethylene capacity at its Freeport, Tex., plant by 67%. The expansion will boost capacity at Freeport to an estimated 100 million pounds annually. This is the second big expansion for the plant since it was built in 1955. Capacity was doubled early in 1959. The present expansion will be completed in 1961. Dow is building polyethylene facilities at Plaquemine, La., and Bay City, Mich.

Tidewater has begun construction of a sulfur-recovery and cycling plant in New Hope Field, Franklin County, Texas. The plant will recover 224 long tons of sulfur daily from 50,000 M.c.f. of raw gas that contains 15% hydrogen sulfide. The plant is the largest of its type in Texas and the second largest in the nation. The plant also will remove 7,500 bbl. of distillate, 1,040 bbl. of propane, and 550 bbl. of butane daily from the raw gas. The plant uses the Girbotol process to remove the hydrogen sulfide from the raw gas and recovers the sulfur with the Claus process. The stripped gas will be reinjected into the Smackover sand reservoir. Brown & Root, Inc., is the contractor. Completion is scheduled for the early fall.

A polyvinyl chloride plant for B. F. Goodrich Chemical Co. will be designed and built by Scientific Design Co., Inc., at Watson, Calif. The plant is Scientific Design's ninth PVC project and will incorporate the most advanced manufacturing facilities. Completion is scheduled for spring this year.

Plans for a $17-million gas-gathering and processing project near Rimbey, 110 miles north of Calgary, has been conditionally approved by the Alberta Oil and Gas Conservation Board. The project is designed to gather and process raw gas from the Homeglen-Rimbey and Westerose South (Dick Lake) fields. British American will be the operator.

Also for Refiners . . .

IN THE NEWS: Ike's budget proposal for another hike in gasoline tax is stirring up industry protests (p. 128) . . . French plan for government-controlled oil-marketing monopoly has gained very little ground since Pinay ouster (p. 138).

PLUS THESE TECHNICAL REPORTS: Overcapacity still a refiner's problem (p. 176) . . . Gas-liquids output hits all-time high (p. 178) . . . Continued petrochemical growth assured (p. 183).

PHOTOS IN THE **NEWS**

Spherical Pigs

COLORADO INTERSTATE Gas Co. is pioneering a new approach to purging gasoline from a 40-mile stretch of its gas-gathering system in the Mocane and Laverne areas of Oklahoma. Neoprene spheres of varying sizes are pushed by the gas through the 16, 18, 20, and 24-in. lines carrying the liquids with them. Near the Mocane plant, the liquids drop off into two 34-in. pipes, 900 ft. long, where they are sent to storage and later piped to the Warren gasoline plant. The spheres are caught in a pig receiver, and the gas continues on its merry way. Workmen are shown above loading one of the spherical pigs.

Seismic Fishing

TWO SMALL fishing boats off the southern coast of England are being used by Seismograph Services, Ltd., in a detailed study of an anticline extending offshore from Dorset.

A small, possibly commercial oil find, has been made in the onshore part of the structure by British Petroleum Co. Interest in southern England has been enhanced by strikes in the Paris basin which extends across the English Channel.

Pass the Salt, Please

FOOD SERVED on Esso Standard tankers gets a continuous testing from a group of tasters. A taste board composed of port stewards, purchasing officials, and members of the Bayonne refinery's marine services department is shown at work above.

It picked 22 canned fruits and vegetables for ship tables during the coming year. Spot tests of varieties picked will be made throughout the year to insure that taste, texture, and quality remain constant.

Speedy Pipelaying

WORK ON Transwestern Pipeline Co.'s gas line from Texas to California is ahead of schedule, but it was rough going in some parts of Arizona. Pipe is shown here before being laid into a ditch in some rocky terrain. Contractors have cleared 475 miles of right-of-way and lowered into the ditch 178 miles of 30, 24, and 20-in. mainline pipe. Eleven pipeline spreads employing 3,613 persons are working on the line. Other workers have completed a carbon dioxide removal plant in Puckett field. And the purchaser, Pacific Lighting Gas Supply Co., is on schedule with the California section of the line.

Service Contractors Study Ethics Code

"Unethical minority" is target of committee set up by the AOSC.

OIL-WELL servicing contractors took a first step last week toward eliminating the shady dealer as a real threat to their industry.

The Association of Oilwell Servicing Contractors, in its fourth annual convention in Dallas, formed a committee to study the need for a code of ethics and to recommend action to the association's directors.

The committee is expected to report at the next directors' meeting, probably in April or May.

The association acted following a strong call for such a code by J. A. Sutcliffe of ROWSCO, Inc., Russell, Kans. Sutcliffe was named to head the ethics committee.

Sutcliffe blasted hard at an "unethical minority" of contractors who have placed the well-servicing industry in "an extremely bad light" with its parent industry by "stooping to bribery and kickbacks to get work."

Published price schedules of these contractors, Sutcliffe said, are a farce.

Sutcliffe said such practices are giving the entire industry a bad name as well as badly undermining realistic price schedules of legitimate contractors.

Crackdown urged . . . Oil producers are beginning to realize that they too are getting bilked via conspiracies between their own employes and unethical service contractors.

And they are taking steps to advise all service and supply firms with which they do business that entertainment or gifts to their employes will not be tolerated, Sutcliffe said. But, he added, this isn't enough.

Service contractors must police themselves to regain the parent industry's respect.

The paramount purpose of the AOSC, Sutcliffe said, should be to develop an unimpeachable code of ethics. And it should demand strict adherence of its members to this code as a condition of membership.

The Kansas contractor urged that this code require AOSC members to make available their payroll and invoice records to inspection by an authorized AOSC representative and by their customers.

It could then be determined whether charges had been padded or invoices boilerhoused. "Violations of this nature should result in loss of membership and publication of such dismissal in the AOSC magazine," Sutcliffe said.

NEW AOSC PRESIDENT, J. W. Wilkins (right) of D. & J. Service, Inc., Andrews, Tex., takes over the reins from J. C. Williams, Jr., of Crusader Drilling & Service, Springhill, La. Serving with Wilkins will be Jimmy Hollis, Southwestern, Inc., Hobbs, N. M., treasurer, and Leo Kent, Kent Well Service, El Dorado, Kans., first vice president.

Industry ailing . . . This would help, but not entirely cure, the general financial illness now afflicting the well-servicing industry, Sutcliffe said.

To regain its economic health, the industry is going to have to realize that its price schedules haven't kept pace with rocketing costs, he said.

He urged contractors to adopt cost-accounting systems—or, if too small to justify such a system, to use a simple analysis every 6 months of costs in relation to receipts from equipment and farm labor.

In 1935, Sutcliffe said, a contractor could get into business in 3,000-ft.

PIPELINE BRIEFS . . .

A 37-mile gas-gathering system of 3 to 8-in. pipe is being constructed by Phillips Petroleum in north Eddy County, N. M. Lasley Construction, the contractor, expects to complete the project March 1. Phillips is laying 17 miles of 3 to 16-in., under contract to George W. Davis Construction, in central Oklahoma.

A 66-mile 20-in. gas line is planned in Pennsylvania by the Pittsburgh Group Companies of the Columbia Gas System. The line will be laid from Abbottstown to the Fulton-Franklin County line. A 21-mile 20-in. line is planned between Springhill and Wharton townships, Pa., and a 5-mile 20-in. line will be laid in Monongalia County, West Virginia. The projects are to be completed by October 1960.

Bids will be received February 9 on a 115-mile 36-in. line which Southern California Gas and Southern Counties Gas will lay from Newberry and Placentia, Calif. Completion is scheduled for August of 1960.

A 95-mile 10-in. line built by the Government in 1919 to supply natural gas to a helium plant near Fort Worth, Tex., will be sold by the General Services Administration. Bids will be opened in Dallas February 9. Lone Star Gas, which operated the line for the Government until 1929 and has leased it since, transports some 10 to 14 million cubic feet daily through it from Petrolia to the Fort Worth area.

A. E. Helm has sold his interests in Banister Construction, Ltd., Fulton

production with a single-drum unit mounted on a two-axle, 1½-ton truck costing less than $6,000. Now the same operations require an investment of $25,000 or more where only a single-drum unit is required.

Many producers, he said, now require a double-drum unit equipped with tubing line, sand line, power tongs, tubing and casing swabbing equipment, bailer, jars, and tools and supplies for any eventuality.

Such a unit must be followed by a pickup fully equipped with tool boxes and pump rack. State regulations regarding axle-load limits require a tandem truck of a size sufficient to properly distribute the load.

"Where a 1½-ton truck costing $850 was enough to carry a single-drum unit in 1935, we now are required to use a 7 to 10-ton tandem costing $10,000 to $15,000, a pickup fully equipped costing $2,500 and up, and a set of power tongs costing $7,000. Where a double-drum unit is required, the cost of the unit with all of its essentials runs from $50,000 to $80,000 and up," Sutcliffe said.

AOSC to act . . . The association this year plans to initiate action it hopes will ease this contractor headache, too.

An effort will be made to remodel the present AOSC recommended cost-accounting system so that it will be suitable for use by all contractors.

AOSC hopes to complement this action by hiring a recognized cost-accounting firm to study the industry and its current price schedules and to recommend new schedules which would be fair to producers and still furnish adequate contractor profits.

Corn State May Have Oil Producer

IOWA'S hopes of becoming the newest oil-producing state in the nation have been raised by an indicated discovery in Howard County, about 10 miles south of the Minnesota border in the northeastern part of the state.

The possible find is H. P. Jesperson 1 Niewald, SE SE 31-99n-12w, 10 miles west of the town of Cresco.

According to the operator in Omaha, a small pump got 49 bbl. of oil per day on a 4-hour test in what is believed to be Ordovician at less than 1,500 ft. There were two zones, but the lower pay is unknown. While attempts were being made to acidize, tool was stuck in the hole and crews last week were fishing.

The location is on the extreme western flank of the Wisconsin arch and in the northern end of the Forest City basin. Most drilling in Iowa has been in the southwestern corner of the state near the producing area of southeastern Nebraska and northwestern Missouri. However, a wildcat is being drilled in Hancock County in the northern part of the state, southwest of the indicated discovery.

Banister, Ltd., and Banister Helm, Ltd., pipeline construction firms in Canada, to R. K. Banister. Helm has been associated with Banister in pipeline construction since 1948 and will remain with the companies as a consultant. He has been president and general manager of Banister Helm and secretary of Fulton Banister.

Contracts for expansions at several compressor stations of Peoples Gulf Coast Natural Gas Pipeline Co. (formerly Texas Illinois) have been awarded to three contractors. A 2,000 hp. unit will be added to each station. Contractors are Trend Construction Co., Oklahoma City, at Lufkin and Marshall, Tex., and Texarkana, Ark.; H. B. Zachry Co., San Antonio, Tex., at Malvern, Searcy, and Biggers, Ark.; and Dravo Corp., Pittsburgh, at Jackson, Mo., and Hammond, Ill. Three 3,300-hp. units are planned at Victoria, Tex.

Deliveries of crude oil during December through Trans Mountain Oil Pipe Line Co. averaged 105,552 bbl. daily, some 30,000 bbl. daily above the month in 1958. Average deliveries for 1959 were 98,239 bbl. daily compared to 81,003 bbl. daily the previous year.

Bids will be received this week on a 60-mile 6-in. line planned by Magnolia Pipe Line from Hull to Beaumont and Orange, Tex. The line will transport LPG.

Also for Pipeliners . . .

IN THE NEWS: New idea in gas-turbine compressor stations means more gas pipeline muscle per dollar (p. 120) . . . Flexible plastic-steel pipeline approved from mainland to Vancouver Island (p. 129) . . . New grinder will put smooth surfaces and 30° bevels on pipe ends in the field (p. 131) . . . Spherical pigs purge gasoline from gas line (p. 132) . . . Pipeline construction report (p. 254).

PLUS THIS TECHNICAL REPORT: Banner year seen for pipelining in 1960 (p. 184).

Texas Allowable Tops 3 Million Barrels

• Railroad commission retains 10-day producing schedule for February, but short month increases the allowable to 3,048,506 bbl. daily.

THE TEXAS crude-oil allowable will climb over the 3,000,000-bbl. daily level in February for the first time in many months.

The Texas Railroad Commission set the allowable for February at 3,048,506 bbl. daily after weighing buyers testimony at the regular statewide hearing last week.

This is 160,476 bbl. daily over the initial allowable for January and 139,868 bbl. daily above the allowable in effect January 2.

The commission retained January's 10-day producing schedule. The allowable increase stems from February's having two fewer calendar days.

The February allowable was set at a level generally compatible with wishes of a majority of the crude-purchasing companies. Nominations by the buyers ranged all the way from 8 to 11 days—a span of more than 560,000 bbl. daily. But querying of buyers established to the commission's satisfaction that a 10-day schedule would work no hardship on either the high or low nominees.

ALLOWABLES BY DISTRICTS

District—	February	Change from Jan. 2
1. Southwest	50,220	+ 1,304
2. Gulf Coast	125,194	+ 6,559
3. Gulf Coast	396,439	+ 15,194
4. Southwest	202,899	+ 9,550
5. East Central	32,564	+ 1,391
6. Outside East Texas Field	127,865	+ 6,640
6. East Texas Field	150,249	+ 7,225
7-B. N. Central	174,641	+ 6,381
7-C. W. Central	148,013	+ 7,938
8. West Texas	1,234,203	+ 67,528
9. North Texas	262,304	+ 7,390
10. Panhandle	143,915	+ 2,768
TOTAL	3,048,506	+ 139,868

Of the 12 buyers nominating, only one sought 8 days, four asked for 9 days, four for 10 days, and three for 11 days. On the high side were Humble, Mobil, and Atlantic, while Phillips sought the deep cut to only 8 days.

Warns of surplus... In its testimony before the commission, Phillips urged that the industry should start now to cut production and runs and to prepare for the spring drop in demand.

Phillips' John Harris told the commission that warmer than normal weather over the nation in December and the first half of January had held consumption of oil products to well below expected levels.

"Unless steps are taken to reduce heavy product inventories now, we are sure to be in trouble later on when demand traditionally weakens," Harris said. He pointed out that February normally is a lower demand month than January.

Kansans Count Problems at KOMA Meeting

KANSAS oil men discussed their major headaches last week and passed resolutions aimed at doing something about them.

Occasion was the 45th annual meeting of the Kansas Oil Men's Association in Wichita.

Here's how the association, made up mostly of marketers, voted on:

...Jobber-supplier relations. Brokers are buying and selling surplus products below prices available to regular jobbers, the Kansans said. This leads to prolonged price wars.

The KOMA asked that jobbers and dealers get equally attractive offers before products are offered elsewhere.

...Government interference. The marketers held that quarrels can be settled within the industry and pledged themselves not to ask the federal Government to solve their problems.

...Credit cards. The fraudulent use of credit cards is on the increase. The Kansas marketers will press for a state law making such use a crime.

...Farm credit. Jobbers are losing money on bad debts without recourse to crop liens. They will seek laws permitting them to make such liens.

...TBA sales. The Kansans see congressional proposals to bar petroleum jobbers from tire, battery, and accessory sales as an infringement on private enterprise. Their resolution against such a law was sent to Rep. James Roosevelt, chairman of the subcommittee on distribution practices.

...Gasoline taxes. The oil men strongly opposed an additional one-half cent federal tax on gasoline and urged that the present extra one-cent levy be allowed to die on its expiration date in 1961. Taxes now add 43% to the price of Kansas gasoline.

Dowell Has Wax-Inhibiting Process

THE OLD PROBLEM of paraffin deposits in oil wells has a new cure, according to Joseph P. Moran, manager of technical services and development for the Dowell Division of Dow Chemical Co.

He said the heart of the new approach is the special cleaning job on pipe in the well and then application of chemicals. The chemicals are easy to handle, nontoxic, nonflammable, and harmless to refining processes.

Most important step in the process is preparing the well, Moran said. All metal parts to be treated must be free of paint, wax, and oil.

When this cleaning step has been completed, chemicals are applied and repeated at regular intervals. They make the metal parts of the well water-wet and prevent adhesion of paraffin particles.

Application of chemicals is made in the same way as other down-hole treatments, such as demulsifying agents and corrosion inhibitors.

Cost of the application depends on two factors: Time required in preparing the well and quantity of chemical required.

Field tests covering many months indicate that a well can be kept clean at a cost of about 3 cents a barrel of fluid produced.

Moran said that the research and field-testing program on the process has not been completed. Commercial application will not be general until this is done.

Mobil Makes Another Deal in North Africa

MOBIL International has taken an interest in another big chunk of the North African oil patch.

The foreign division of Socony Mobil has obtained 50% interest in a 10-million-acre exploration permit in Tunisia.

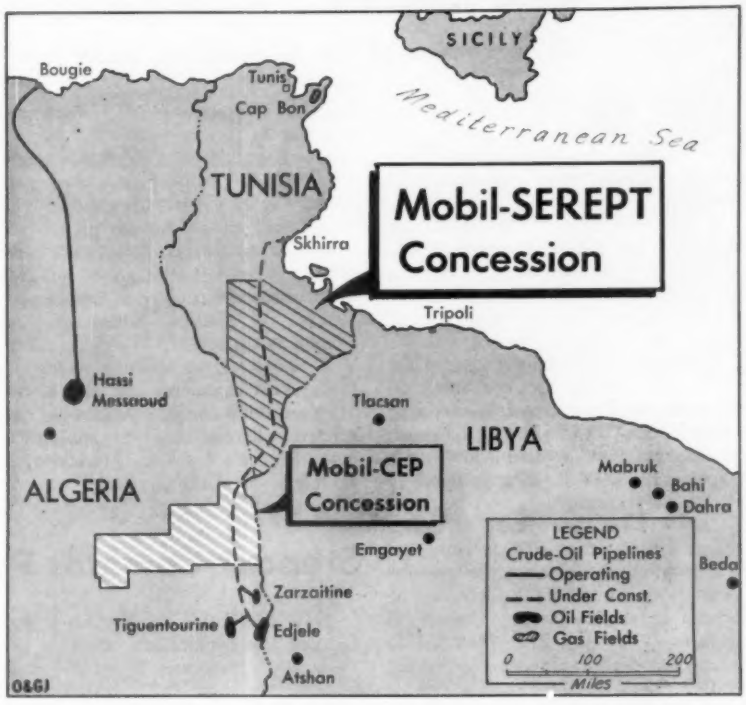
The permit area lies in the southern half of the country, and is about 200 miles from commercial production in Algeria.

Mobil's move follows its recent acquisition of 25% interest in an 8-million-acre concession in neighboring Algeria. The southern corner of the Tunisian acreage lies only a few miles north of the northeast corner of the Algerian search area.

Mobil obtained its Tunisian rights from SEREPT, which will continue to hold 50% interest in the permit, and will be operator for a two-company program. SEREPT is owned 23% by the State of Tunisia, 56% by a French Government agency, BRP, and the remainder by various French investment interests.

Tunisia has no commercial oil production. But SEREPT has a gas field at Cap Bon in the northern part of the country, outside the license area where Mobil has taken the interest.

The two companies plan an extensive evaluation program in the permit area. SEREPT has explored the license for years, so far without success. One rig is currently drilling on the block.



Other American companies with Tunisian concessions are the Conorada group, with rights covering nearly 7 million acres, and Rimrock International Corp., which is in partnership with an Italian company, SOM, in a concession covering nearly 5 million acres (OGJ, Aug. 18, 1958, p. 122).

Across the border in Algeria, Mobil acquired its 25% interest from a French company, CEP, and its partners. The concession extends westward from the Libyan border, and lies between the Edjele and Hassi Messaoud producing areas (OGJ, Jan. 4, p. 63).

India Opens the Door to Private Companies

THE OIL industry has received a vote of confidence in India, where the government has made an abrupt about face in its oil policy.

After years of insisting that all further oil development would be carried out exclusively by the government, the country is again inviting foreign companies to join the search.

Nobody knows for sure what terms the government will seek for concessions. A new law serves as a framework for negotiations, rather than as a list of hard and fast terms.

But the move shows that another country has had second thoughts about the oil industry, and now believes it may not be such a bad idea after all to do business with private companies. This decision by India could be especially significant in the case of India, which is one of the pace setters among the world's underdeveloped countries.

Terms . . . The only major points that set down specific terms for exploration are the royalty and rental payments. Royalty is a comparatively low 10%. Rental payments on acreage rise steeply, indicating that the government wants any newcomers to start work quickly.

Exploration licenses run for 4 years, with the possibility of two 1-year extensions. Rental of 10 rupees ($2.10) per square mile the first year rise in stages to $105 per square mile the fourth year, and $157 for each year of extension.

Virtually every other key point of a contract is open to negotiation. The law says concessions will ordinarily be limited to 3,000 sq. miles, mining licenses will ordinarily be limited to 100 sq. miles, with an ordinary duration of 20 years. But the wording deliberately leaves room for negotiations.

India will continue to carry on its own exploration program in the Cambay area, north of Bombay, where it has found indications of oil, as well as in other license areas it has reserved for itself.

But its decision to throw the country open to exploration by private firms came after Walter Levy, an American consultant, and others advised the government that India could not possibly afford the investment needed to develop its oil industry.

Pinay Fight May Kill Monopoly Plan

• France's plan to control oil marketing has gained little if any steam since Pinay's ouster. It now appears that any plan launched will be a watered down version of the original monopoly proposal.

ANTOINE PINAY is the latest French political casualty, but he may have scuttled the plan to mould a government-controlled oil-marketing monopoly in France.

A full week after Pinay's departure from the French cabinet, the proposed marketing company, Ste. Industrielle des Petroles, was still only a plan, and apparently one that is losing ground with every passing day.

Lined up almost solidly against the whole idea behind SIP are about 60 independent French marketers who control from 10 to 15% of the French oil market. Few of them look with favor on the idea of being gobbled up by the new company.

Critics of the government oil policy charge openly that SIP is only the first step on the part of the government's big Bureau de Recherches de Petrole to nationalize the French oil industry. They say BRP intended to create a French counterpart to Enrico Mattei's powerful Ente Nazionale Idrocarburi in Italy.

Pinay's role . . . Credited with building a strong and solid French economy as President Charles de Gaulle's minister of finance and economic affairs, Pinay opposed the plan bitterly.

The noted French politician and economist found himself in the role of champion to free enterprise as opposed to what he calls the "dirigist" (directed) economic policies of Premier Michel Debre and Jean-Marcel Jeanneney, minister of industry and commerce (OGJ Jan. 11, p. 62).

Pinay attacked these policies as "Sovietization" of the French economy. He said he'd fight them in the cabinet unless De Gaulle tossed him out. That's what happened.

Pinay's ouster from the cabinet and his public statements in the few days before De Gaulle backed the premier focused public attention on the oil-marketing scheme and the opposition began to mount.

The plan . . . As conceived by the government, SIP is to furnish the link in a field-to-consumer route for the 50% of Saharan oil controlled by the government.

There is a strong suspicion in France today that this was to be carried further later to embrace the remainder of Sahara production in private hands.

The French Caltex subsidiary, with a 25,000-bbl. refinery and marketing about 4% of French demand, is the cornerstone of the French plan.

French independent refiners and marketers were to be added to give the government-controlled Sahara producers an assured outlet on the French homefront.

If SIP could be made a strong infant, other refiners and marketers, most of them major companies, can foresee uneasily that they might be next. France's big Cie. Francaise de Petrole is privately controlled in spite of a 35% government interest. CFP has about one-quarter of French refining capacity, but also an interest in Iraq's oil output.

CFP and the majors dominate the French market, but do not control it. Shell sells about 20% of domestic product demand; Esso about 14%; British petroleum about 13%; and Mobil about 5%. The rest is held by independents.

Now, in the aftermath of Pinay's departure, the plan to form SIP seems to have lost most of its steam. If it is ever formed, it probably will be on a much smaller scale than its backers once dreamed.

Stepout Confirms Paris Basin Strike

THE FRENCH company that sparked the exploration boom in the Paris basin continues to set the pace with further successes.

Petrorep's first stepout to a find at Villemer, 40 miles southeast of Paris, has yielded 12 bbl. and 47 bbl. daily of crude on the initial tests of Dogger limestone productive in the discovery.

The tests on Villemer 102 were made in a 33 ft. section topped at 4,944 ft., about 16 ft. lower than in the first well. Villemer 101 is on production at 375 bbl. daily.

The company's first field, at Coulommes, 25 miles east of Paris, is making better than 5,000 bbl. daily.

Of 34 wells in Coulommes, 28 are producers, two are dry holes, and four are awaiting completion. The field's surface area now covers more than 5 sq. miles. Two field wells came in with high initial flows. CS.E 38 tested at the rate of 3,780 bbl. daily, and B.F. 21 tested 4,725 bbl. daily (OGJ, Dec. 21, 1959, p. 64). Actual production of the wells is being held down to a much lower level.

FOREIGN BRIEFS . . .

A 2,740-sq.-mile exploration permit in the Algerian Sahara has been awarded to Cities Service and two French companies, Prepa and Francarep. The group will spend more than $2.3 million in a 5-year period. Soc des Petroles de Valence, half owned by British Petroleum, was granted a 463-sq.-mile concession at Erg Barga.

Russia's tanker fleet will show its biggest capacity increase this year. The growth is being paced by the 40,000-ton, 8-knot "Peking," newly commissioned for the Black Sea-Far East run. Two sister ships are under construction.

A second pipeline from Karamai oil fields in northwest China should pave the way for further crude production gains by the country this year. Karamai output reportedly tripled last year, raising China's output to nearly 70,000 bbl. daily. The newly opened line extends to a refinery at Tushantze.

Russia has opened a second 800-mile crude line from Tuimazy fields, west of the Ural mountains, to Omsk, a refining center in Siberia.

Assam Oil Co. averaged better than 1,000 ft. per day drilling Nahorkatiya 51 in northeastern India. The company completed the well at 9,050 ft. in 8 days, 18½ hrs. The well flowed

A BIG GAS-INJECTION plant goes up in the sandy wastes of Kuwait as . . .

Repressuring Is Near for World's Biggest Field

CONSTRUCTION is moving rapidly ahead on a gas injection project for the queen among the world's oil fields.

The facilities are being installed in Burgan, the giant oil pool that has made tiny Kuwait the free-world's third ranking oil country. An injection plant designed to return 100 million cubic feet daily to formation will open at mid-year.

The program is in line with a trend toward gas reinjection in big foreign fields for conservation and pressure maintenance purposes. Burgan's 224 flowing wells produce more oil than any other individual field open today, accounting for most of the sheikhdom's 1.4 million barrel daily production.

The injection plant is located ½ mile north-northeast of Burgan's No. 3 gathering station. Its heart will be two centrifugal compressors operating in series, and driven by 7,000 hp. single-shaft gas turbines.

Gas from the gathering center's first stage separation will arrive at the injection plant at 395 psi. and 110° F. The first compression stage will raise pressure to 1,003 psi. and 255° F. The gas will then pass through a cooler, where it will be lowered to 140° F. The second compressor will increase pressure to 1,920 psi. at 250° F., and a second cooler will lower the temperature to 140° F. Gas at 1,920 psi. and 140° F. will be turned to the Wafra sand through five wells.

The turbines will be fired by gas tapped from the incoming line and reduced to 150 psi. Electric power will be taken from the existing field supply and reduced in two stages to 440 volts, 3-phase, 50 cycles.

Instruments will control the plant automatically. In case of breakdown the plant will shut down automatically.

1,600 bbl. daily through a ½-in. choke. No. 52 and 53 are drilling ahead. Nahorkatiya is shut in pending construction of a 720-mile crude-oil pipeline.

The plastics division of the British-based Imperial Chemical Industries will increase polythene production about 15% this year to 105,000 tons. New plants in India and Australia, and increased output from existing plants in France and Germany, will make more polythene available to the United Kingdom market. There have been fears of a shortage.

Gas production in Russia is failing to meet ambitious goals set by Premier Khrushchev in 1957, despite impressive year-to-year gains. A revised target for 1960 is 5.2 billion cubic feet daily. This is a one-third gain over this year's estimated level, but is under the original long-range goal.

Oronite Chemical Co. and Societe' Californie-Atlantique, a French firm now being formed, will jointly build a paraxylene plant at Donges on the Loire River. The new plant is scheduled for completion by late 1960.

Birwelco, Ltd., of Aston, Birmingham, will supply seven Petro-Chem Iso-Flow furnaces, ranging in size from 55 million B.t.u. per hour to 110 million B.t.u. per hour, for the new Esso refinery on Milford Haven. The Milford Haven refinery is being engineered by Foster Wheeler, Ltd.

A combination aerial magnetometer and photographic survey has been made in Argentina for Union Oil Co. by Fairchild Aerial Surveys, Inc. Carried out under severe weather conditions, the magnetic survey covered 13,000 line miles.

British Petroleum has ordered a $700,000 Ferranti electronic computing system for its London headquarters. The system, the fastest of its type made in Europe, will be ready for service early in 1961. Another installation, a $1-million refining laboratory, has opened at Llandarcy refinery, Wales.

The Japanese fishing industry has signed a 3-year agreement with Russia for the purchase of fuel oil for fishing boats. The imports will total 100,000 tons a year, or about 2,000 bbl. daily.

New Plant Will Serve Aramco's Newest Field

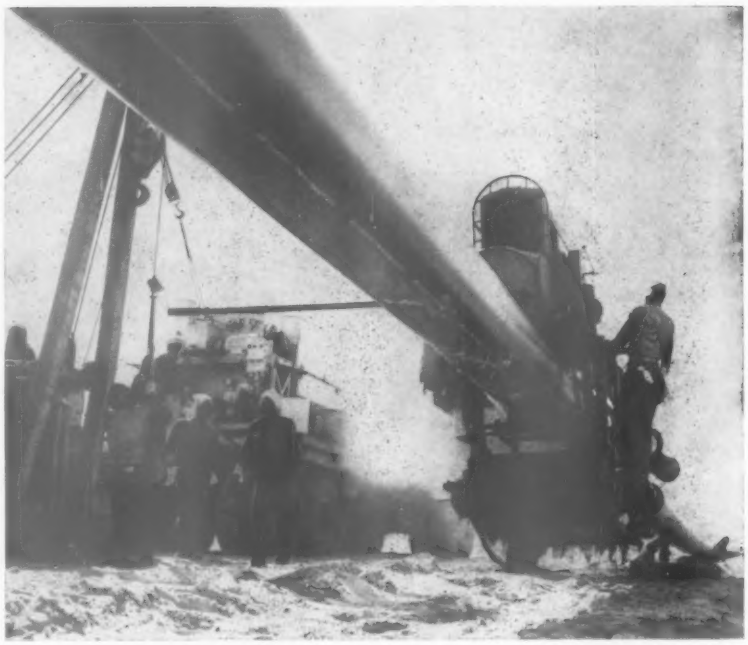
ONE OF THE world's biggest gas-oil separator plants will handle crude from the newest Saudi Arabian field to be developed for commercial production.

The $2,790,000 unit will take care of 45,000 bbl. daily from Khursaniyah field, which will be opened by Arabian American Oil Co. early this year. The plant initially will take oil from five producing wells, each connected by an 8-in. flow line. But the separator will have facilities for a total of 10 flow lines, enabling it to handle more wells as they are drilled.

Khursaniyah has the distinction of having an existing crude trunk pipeline running right across the middle of it. A 24-in. tie line from the separator to a pumping station on the Safaniya-Ras Tanura system will be only about 2 miles long. Some of the flow lines from the wells to the plant are as much as 3 miles long.

Before moving into the Safaniya-Ras Tanura system, the mixture of sour crude gas and oil coming from the wells will be reduced in pressure in the spheroid from 200 to 3 psi.

The sour, 32°-gravity Khursaniyah crude will be shipped to Ras Tanura in batches. It will be alternated with sweet, 27°-gravity crude from Safaniya. Plans are to deliver an average of 120,000 bbl. daily of both crudes, 45,000 bbl. daily from Khursaniyah, and 75,000 bbl. daily from Safaniya.



A 24-IN. LINE will move crude from Aramco's Khursaniyah field.

Aramco discovered Khursaniyah in 1956, about 105 miles northwest of Dhahran and 60 miles southeast of Safaniya. The first well discovered oil in commercial amounts in four zones, the Arab A, B, C, and D members. It was completed as a producer in Arab D.

One rig is drilling in the field. Five wells have been completed as producers, Nos. 1, 3, 5, 7, and 8. The field will be the sixth to go on production in Saudi Arabia.

Austria Deals Mobil, Shell in on New Firm

PRIVATE companies will have 26% interest in a sales and purchase company being set up in Austria.

Affiliates of Mobil Oil and Royal Dutch-Shell each will hold 13% in a company that will buy all domestic crude production. The Austrian Government will hold the remaining 74% interest. The oil will be allotted to private and government refineries at a fixed ratio, and the products will be bought back for redistribution to marketing organizations of the parent companies.

The new company is a key part of an agreement that will end the long-standing problem of reparations to Mobil and Shell. Properties of the firms were confiscated by the Nazis in the 1930's and were taken over by the Russians after World War II.

Claims by companies have been hanging fire since 1955 when Austria regained its independence. The biggest prize among the properties has never been returned. This was the area on which Matzen-Auersthal oil field subsequently was discovered. The field, while declining, still is the biggest in Europe, accounting for most of Austria's 43,700 bbl. daily.

Another major point in the settlement will be reparation payments of $13.7 million by the government. This will be paid tax free to the companies which, in turn, will reinvest most of the money in local exploration. The companies handle their exploration and production operations through a jointly-owned firm, RAG.

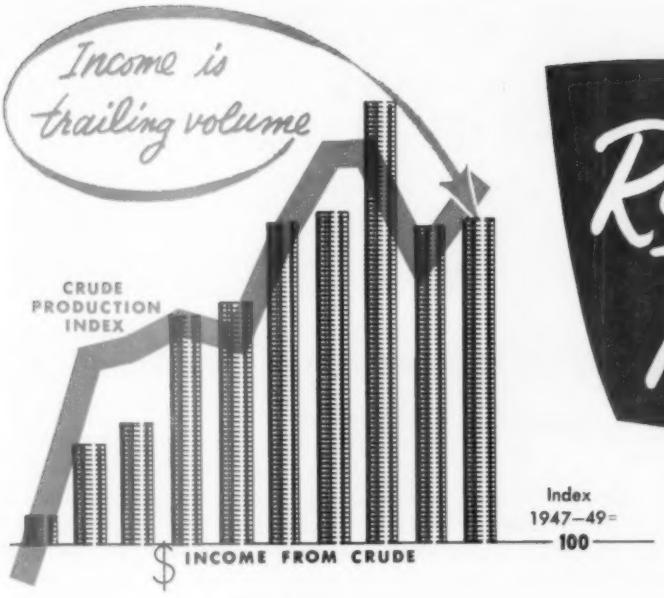
A few contractual details remain to be worked out before the agreement can be submitted to the Austrian Cabinet. But these are expected to cause no delay. Ratification will pave the way for a solution to further questions, including the award of new acreage to RAG.

RAG program . . . RAG produces about 2,300 bbl. daily, of which 1,800 bbl. daily is from the older Zistersdorf-Gaiselberg producing area. About 500 bbl. daily is from the Timelkam area in Upper Austria.

The company's Ried 5 at Aigen, Upper Austria, is an indicated producer at 4,600 ft. Reid 4 has been placed on production at the rate of 140 bbl. to 190 bbl. daily. More wells are drilling on the small structure, which is about ¼ mile wide and 1¾ miles long. A wildcat is drilling at Utzenaich 1, at Wimm.

Government plans . . . OMV's Schwechat refinery will open next year with an initial throughput of 32,000 bbl. daily. Its downstream facilities will include a Platformer.

Rising costs have forced the government company to allot a bigger share of its spending for refinery construction. This will account for about $19 million out of a $29-million budget. Other work will include 144,000 ft. of exploration drilling and 123,000 ft. of development drilling.



Review-Forecast SECTION

As oil enters the challenging '60's

THE TROUBLE with the oil industry is told in the chart at the top of this page: Its income isn't keeping up with its activity.

It's the picture of the oil-producing segment of the U. S. industry only. But if similar figures were available for other branches they would show the same malady of financial anemia.

The 1960 outlook: Good for increased volume and activity, less bright for increased gross income. So oil's health depends on its ability to increase the gross and keep more of it as net profit so as to operate in the black and have earnings to plow back into the business.

The "fever chart" gives background for interpreting oil's present position and prospects.

The crude-price increase in the midst of the Suez crisis (January 1957) brought a boost in income—and also a boom psychology which brought a boost in capacity. Then the Middle East reopened, imports reached new heights, and the U. S. had a business recession. Result: Too much oil despite curtailments, and prices on the skids.

Thus 1958 saw both output and income at about 1955 levels. During 1959, production increased but prices declined, so total income rose only slightly. This was reflected in the drilling rate, refinery construction, capital expenditures, and other activities.

So January 1960 finds the conditions highlighted in the column on the right and detailed in the following pages.

- Operators plan to drill 10,569 wildcats, 40,200 field wells in 1960, for a total of 50,771.
- Completions rose 1,782 wells in 1959; total was 3.6% more than the year previous. Wildcat decline was halted.
- Crude production rose 336,000 bbl. in 1959, but still was under the figure reached in 1957.
- Total gas-well completions reverse 2-year slump, but upswing was not sharp. Marketed production rose 6.7%.
- Liquid hydrocarbon reserves rose to 40.54 billion barrels, as crude gained 245.6 million barrels, and natural-gas liquids 285.2 million.
- Total demand for petroleum products will rise to 10,103,000 bbl. daily in 1960, for a percentage gain of 4.6%. Product prices probably will be higher.
- Imports should hit record high in 1960, but only 53,000 bbl. daily more than the 1959 average—18,000 bbl. crude and 35,000 bbl. products.
- Some relief to the problem of refining overcapacity is in sight, but full solution not yet assured. New construction projects are negligible.
- Gas-liquid output hits all-time high in 1959, and the outlook is for more of the same during the current year.
- One of U. S. pipeline construction's biggest years is in prospect for 1960, continuing the upturn which started a year ago.
- Unprecedented records will be set in exploration in 1960, both in the U. S. and beyond the seas.

Moving out of recession

- Last year's adjustments put the oil industry in better shape to make real progress in 1960
- This year's outlook is for improvement in everything but drilling—if excess capacity is contained

"THE YEAR OF STATISTICAL RECOVERY" is a label that has been hung on 1959.

It isn't completely accurate, because still more adjustments are needed in 1960 to put the oil industry in a balanced and healthy condition.

But 1959 saw U. S. oil make great strides away from conditions that, only a year ago, threatened chaos and disaster. It enters 1960 with a good foundation for steady—though not spectacular—progress toward keeping the use of its excess capacity geared to current requirements and thus improving its earnings and growth prospects.

Coping with overcapacity. The outstanding feature of 1959 was the belated general realization that the oil industry has excess capacity in virtually every segment. This condition had been building up for some time, but its full impact was not evident until about a year ago. So much of 1959 was devoted to adjusting to the situation.

The most far-reaching event was imposition of mandatory import controls. But this action was too little and too late to make the domestic industry healthy immediately or by itself. In fact, it boomeranged. Great expectations from the control program stimulated premature increases in production and refinery runs. The result was that the volume of oil physically on the market was still greater than consumptive demand, with the inevitable effect of weakening prices and lowering per-barrel earnings.

Toward better balance. What made 1959 a year of statistical recovery was that supply was finally brought fairly well into balance with demand by the end of the year. With imports held to a specific level, crude production was so curtailed that crude inventories were brought down to a satisfactory figure.

Refiners did not do so well, though there was evidence late in the year that they were making an effort. Stocks of gasoline and distillate remained above the too-high 1958 figures most of the year, and at year end were still excessive in the light of current runs and demand.

Still some lagging. This degree of statistical recovery, while gratifying as the basis for more orderly and predictable conditions in 1960, brought little tangible benefit to major segments of the industry. Drilling remained at a low level. So did refinery-construction work. And there is small prospect for early improvement for either.

Nor is there anything in the year-end statistics to promise much early increase in crude or products prices. So every operator in every division is concentrating on cutting costs—seeking ways to get more profit per barrel. For while total barrels will increase normally, total dollars are likely to lag.

Capital expenditures. Renewed confidence is reflected in higher capital expenditures in all divisions this year. Preliminary returns on the Journal's annual survey indicate that drilling and production expenditures will probably top 1959 slightly, perhaps by 3%.

The new emphasis on marketing is evident in a 13% boost. Partial returns from 82% of the industry indicate this division will invest about $490 million in marketing facilities.

While very little new refinery construction has been announced, preliminary figures based on nearly 85% of U. S. capacity point to a $675 million investment, up 25% from the very low 1959 level, and about equal to 1958 activity. Included are some petrochemical projects.

In pipelining, natural gas continues to take the lion's share of new capital. An even billion dollars will be spent this year for gas lines, with $140 million going to crude and products lines. These expenditures are up 5% and a whopping 75% for the respective systems.

Many company budgets are still awaiting approval, so firm industry figures will not be available until late this quarter.

In summary. The general year-end picture looks like this: A reasonable increase in demand; continued overcapacity; the volume of oil physically on the market in better relationship to actual demand; a rather static price structure; intense competition; profit opportunities lying more in efficiencies than in volume expansion.

Box Score of U. S. Oil's Recovery From Its Recession

	1958	% change	1959	% change	1960	% change
Domestic demand (M.B/D)	9,082	3.0	9,421	3.7	9,872	4.8
Crude production (M.B/D)	6,709	—6.4	7,045	5.0	7,376	4.7
Value of crude (M.M.$)	7,380	—8.7	7,579	2.4	7,938	4.7
Gas-liquids production (M.B/D)	809	—1.5	876	8.3	911	4.0
Crude imports (M.B/D)	953	—6.8	960	0.7	978	1.9
Product imports (M.B/D)	747	35.3	801	7.2	830	3.6
Total completions	49,111	—8.8	50,893	3.6	50,769	—0.2
Wildcat wells	9,588	—18.3	10,073	5.1	10,569	4.9
Development wells	39,523	—6.1	40,820	3.3	40,200	—1.5
Footage (Thousands)	197,384	—11.0	208,250	5.5	209,404	0.6
Refinery runs (M.B/D)	7,642	—3.5	7,989	4.5	8,293	3.8
Crude-stock change (M.B/D)	−52		−28		+15	
Product-stock change (M.B/D)	−88		+47		−23	

Drilling: Still in doldrums

The drilling end of the business is one segment not making much progress out of the oil industry's recession. Following a tremendous slide during 1957 and 1958, the number of wells drilled increased a little in 1959 but may remain virtually static in 1960.

Total completions last year reached 50,893, a gain of 1,782 wells or 3.6%. But since 1,200 of these additional wells were in the shallow pay of Kentucky's flash-in-the-pan Green County area it is obvious that the drilling rate in the United States as a whole is virtually trendless.

And as of now the 1960 programs and budgets of U. S. operators call for almost exactly the same number of wells as they drilled in 1959. The oil business being what it is, such plans are always subject to change without notice. A hot development play, a little increase in the price of crude or natural gas, or an improving outlook for demand could easily boost the year's total completions above what is presently programed.

It may be significant that major companies, as a group, have curtailed their 1960 drilling plans more sharply than independents. These big companies could decide to boost their drilling budgets materially later in the year if conditions warrant.

An encouraging trend is the increasing ratio of wildcats to field wells. That ratio dropped sharply in 1958, but now is on the upturn. Last year wildcat completions increased 5.1% while development wells increased only 3.3%. This year the program calls for a further increase of 4.9% in wildcat drilling while development wells may actually be fewer.

The wildcat success ratio last year was a relatively poor 13.16%, since wildcat results were 8.7% oil discoveries, 1.1% condensate discoveries, 3.4% gas discoveries, and 86.8% dry holes.

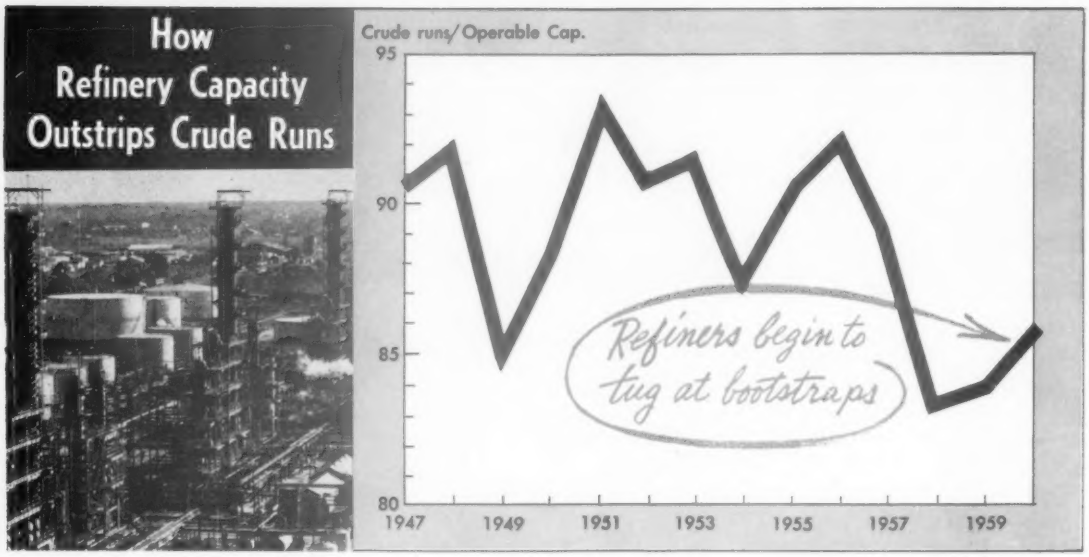
The 1,326 new fields discovered by the successful wildcats brought significant new reserves in several areas, but most of them were relatively small pools and their combined total increased the nation's reserves by only 648 million barrels of crude oil.

Development drilling, however, boosted the reserve estimates for previously discovered fields with the result that total additions to crude and condensate reserves exceeded total production during 1959, though by a less amount than in the preceding year.

Production: Rising, but restrained

Crude production in 1960 will be the highest in U. S. history. But the rate of increase will be less than last year although domestic demand will increase faster.

Reason: Production last year went up much



faster than demand, particularly in the first half. Sharp curtailments later in the year largely corrected this, and 1960 opens with both crude stocks and current producing rates at levels that indicate crude output for the year will rise in close parallel with the forecast increase in demand.

For 1960 the domestic demand for all oils is forecast to rise 4.8%—the best increase in some time—and crude production should increase by 4.7%. In 1959 demand was up only 3.7% while production rose 5%.

The anticipated increase amounts to an average of about 330,000 bbl. per day, which, when spread across the country, will hardly make a dent in the nation's excess producing capacity. But it should ease allowables a bit, particularly if changes in allowables are timed better than in 1959.

Last year's allowables were much too high in the spring (a frequent spring phenomenon), and were kept high by premature optimism about the effects of the mandatory imports-limitation program announced in March.

So by June crude stocks were rising fast and production had to be cut back sharply. Output was held below the spring rates the rest of the year, with the result that crude stocks were brought down to the point where they can safely be increased moderately during 1960.

The growth rate for gas liquids will be back to normal. This was the fastest-growing segment of the industry last year, due to heavy expansion of capacity. But plant construction is leveling off, so 1960's growth will be slightly less than the pace of crude production.

The income prospect for producers is more precarious than the outlook for higher demand. All during 1959 crude-price postings were whittled down, first in one place, then in another, with the result that the average price of crude at the wellhead declined 7 cents to $2.94 per barrel. So even with production up 5%, income increased only 2.4%.

The forecast for 1960 is for producer income to go up exactly in line with production volume—which means that no significant changes in crude prices are anticipated. But that depends. The urge to utilize excess capacity could easily push crude supply so far ahead of demand as to undermine current price postings. And in any event, refiners are not apt to offer more for crude until products prices improve, and this will depend far more on their own policies than on the actions of producers.

Refining: Up just a little

Refining activity should increase less this year than most other divisions of the industry. This is because there are excess stocks of refined products which must be worked down if the industry is to be in a healthy condition. Thus while total demand will increase about 4.6% over 1959, crude runs to stills should increase only 3.8%.

Last year refiners increased their runs by 4.5%, and this was too much. Inventories, particularly of gasoline and distillate, were so high all year as to be a depressant on prices. During the latter part of the year the days' supply of these products reached new highs for recent years.

As with crude production, much of the cause can be laid to too-great expectations from the import controls. In March, just when seasonal conditions dictated curtailment, refiners apparently assumed there would be an immediate shortage of products. Only for a brief period in the fall did they get their runs down to a realistic level.

Even though runs were too high, they were only 84% of operable capacity. And that's the heart of the trouble. It invites the "incremental barrel." Using capacity at full blast reduces unit costs and makes the extra added output look very profitable. But too many incremental barrels went into burgeoning inventories or were sold at distress prices, and either course weakened the market structure.

This year refiners can operate at about 86% capacity, and since virtually no new refinery construction is scheduled, the problem of excess capacity should be much less acute within a couple of years.

Primarily because of their own collective poor management in making more than they could sell, refiners saw their prices at the lowest levels in years. And, since crude prices declined less than product prices, refinery realization also slipped sadly downward.

Marketing: Less chaotic, maybe

Chaotic was the word for oil marketing during 1959, but the prospects are for somewhat more stability during the current year. Gasoline demand is expected to increase by something over 4% and distillate by 5% or more—both the biggest annual increases in some time. So if refiners will hold their output of these key products a little below actual consumption so as to work off the currently excess inventories, markets should be in much better shape.

The fact that the amount of gasoline being put on the market all during the year greatly exceeded the amount that motorists were buying touched off the biggest wave of retail price wars since before World War II. In their struggle to get gallonage, refiners cut dealers' margins, gave unusual discounts, and adopted new distribution patterns. This brought loud complaints from independent jobbers, followed by many investigations by state and federal agencies into accusations that major companies were using unfair methods of competition and attempting to establish a monopoly. Two or three states turned to "fair trading" of gasoline to stop the price wars.

A basic development was the determination of most refiners to control enough marketing outlets to provide a secure home for their products. Almost weekly, it seemed, there was an announcement that some major had purchased an independent jobber or chain of service stations. Less publicized was the fact that many majors also were tied up with—or were building their own—chains of private-brand service stations selling that major's gasoline at less than the price at the major's brand-name stations.

The chief price cutters, whether directed by majors or independents, were the high-volume multipump stations on heavy traffic arteries. As it became evident that such stations could market profitably on a low margin, there were predictions that the historic spread between refinery price and the price at the pump was due for a downward revision.

So perhaps a revolution in retail gasoline marketing was under way, one which might lead to the elimination of many weak, poorly located, and low-volume stations, and, consequently, lower over-all marketing costs with the saving passed on to consumers. Apparently in preparation for such a trend, many big marketers intensified their programs for selecting and training dealers with a view to eliminating the inefficient and upgrading those retained.

Gas: Growing, but troubled

The natural-gas industry is slowing down a little. Marketed production increased 6.7% in 1959, somewhat less than the postwar average. And gas reserves are rising much more slowly. Reserves increased only 2.6% last year, and now stand at 22 times annual consumption as against 33 in 1949.

The drilling of gas wells showed an increase of 2.3% last year for a total of 3,761. Practically all the increase was in exploratory drilling, and 340 wildcats made gas discoveries in 1959.

In the producers' viewpoint, the gas business is going to stop growing and start declining very soon unless producers are freed from utility-type regulation of their prices. Their reasoning is that, for the nation as a whole, producers' income from gas sales is not enough to finance much new exploration and therefore reserves will decline to the point where there will be no new gas available for expanded sales.

On the other hand, in several areas of the country where new gas discoveries were made in the past couple of years, pipelines have offered field prices high enough to stimulate drilling expressly for gas. Those who interpret this phenomenon as refutation of the producers' argument forecast a bright future for continued expansion of the gas business. Those who contend that a much higher field price is needed to obtain a really big increase in reserves forecast stagnation.

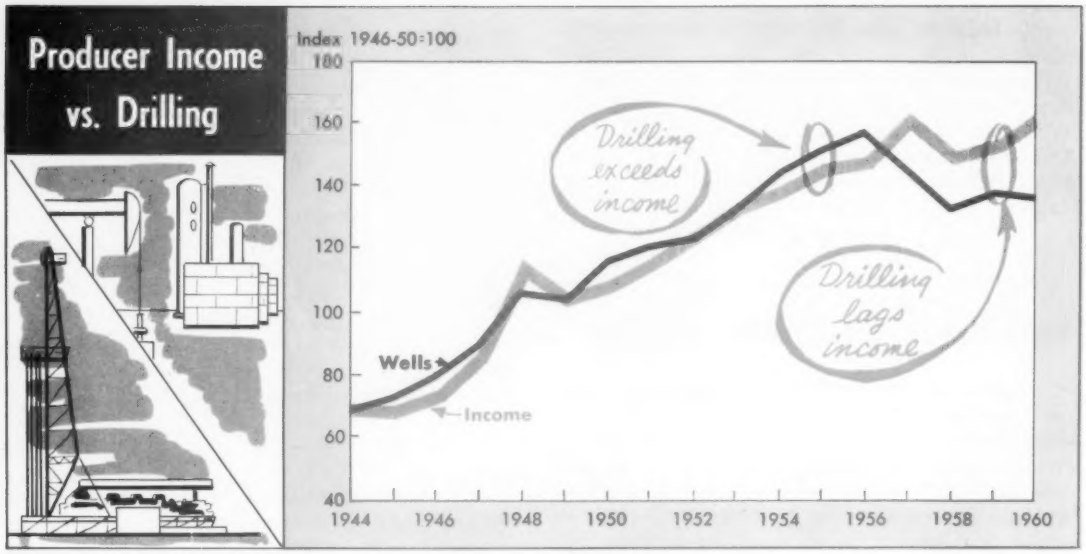
No visible progress was made last year by the Federal Power Commission or the courts in developing a satisfactory method of regulating field prices. Nor does Congress appear inclined to listen to producers' pleas for a change in the law. So old contract prices are held down and many of the new prices in new fields are subject to reduction by court action.

Imports: A controlled increase

For the first time in several years, imports are a predictable figure, since 1960 will be the first full year of the mandatory control plan instituted in the spring of 1959. This gives some meaning to forecasts and permits the industry to plan more intelligently.

The control program permitted higher imports in 1959 than in 1958, and will permit a further increase in 1960. But the rate of increase was severely curbed. Imports are now expected to maintain pretty much their present percentage of the total market, and to increase in line with domestic demand.

In 1958, with crude imports fairly well reined by voluntary curbs, imports of refined products zoomed 35% and brought total imports to 18.7% of domestic demand. The mandatory program, applying to both crude and products, took effect in the third quarter of 1959 and held total imports to 17.6% of domestic demand for the year. The forecast imports for 1960 are 18.3% of forecast domestic demand.



50,770 wells seen for the year

OIL OPERATORS plan to drill more wildcats and fewer field wells in 1960 than they did in 1959. They also have scheduled more footage for the new year.

This information is based on answers to the Journal's questionnaire from a big sample of large and small oil companies. These represent coverage of every active area in the country.

Answers to these questionnaires show that operators' plans for 1960 now call for almost 50,770 wells, or for a slight decrease from the total tabulated by oil scouts in 1959. The final compilation shows the loss to be 124 wells or a decrease of one-quarter of 1%.

Since this indicated decrease is smaller than the range of accuracy of any drilling forecast, the survey shows that operators plan about as many total wells for 1960 as they completed in 1959.

Returns from the survey indicate that oil men have planned about 500 more wildcats this year than last year. On the other hand, scheduled development drilling shows a loss of slightly more than 600 wells.

Since some of the expanded drilling programs will be in deeper areas and since wildcat wells have a greater average depth than development wells, total footage will increase in 1960 despite the slight reduction in total wells.

The average well in 1959 was 4,092 ft. deep. The average is expected to increase to 4,125 ft. in 1960. The influence on average footage by shifts in area drilling is shown, for example, by Kentucky and Louisiana. The shallow play in South Central Kentucky will extend into 1960, but the survey shows that completions for the year may be down about 600 wells. The average well for this state was 1.046 ft. last year.

On the other hand, offshore drilling in Louisiana may show a gain of only 29 wells, but the gain in footage is almost twice the expected loss in Kentucky.

Operators' reports indicate a greater decrease in Texas drilling this year than the net drop for the country as a whole. Since reports mentioned slow payout for certain areas of the state because of the reduced number of producing days last year, increases in allowable production may bring revisions in drilling programs that will raise total drilling for the year.

The chart shows that the number of wells drilled for each million dollars of operators' income was lower in 1959 than for most of the postwar years. This low rate of completions to income will continue in 1960 if oil men stick to plans reported at the first of the year.

Crude production, gasoline-plant output, and natural-gas production will be up this year. There is nothing to indicate a big drop in prices. This means that producer income for 1960 will be higher than for 1959 even after correction for some expected inflation.

If the money comes in as expected, there is a chance that operators will revise drilling plans and complete more wells than they had scheduled at the start of the year.

However, this forecast makes no allowance for the possibility of revisions. It is based on plans reported in January.

1959 score: 10,569 wildcats, 40,200 field wells

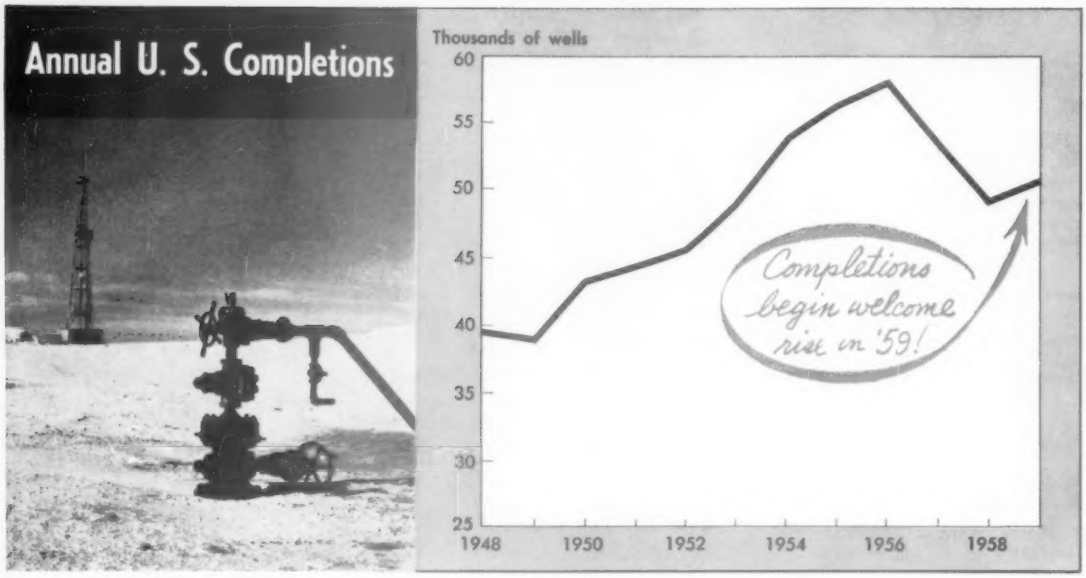
	1960 forecast				Change from 1959			
	Wildcat wells	Field wells	Total wells	Total footage*	Wildcat wells	Field wells	Total wells	Total footage*
Alabama	21	55	76	727	–2	–17	–19	–220
Alaska	15	9	24	255	6	1	7	65
Arizona	29	3	32	117	4	1	5	20
Arkansas	153	764	917	3,114	7	68	75	249
California	400	1,202	1,602	7,626	–2	74	72	283
Colorado	529	431	960	5,027	73	78	151	792
Florida	7	....	7	52	....	....	....	–7
Illinois	450	2,056	2,506	5,464	59	90	149	328
Indiana	344	625	969	1,452	44	45	89	132
Kansas	1,121	2,748	3,869	13,865	55	–145	–90	–295
Kentucky	426	2,350	2,776	2,929	37	–626	–589	–591
Louisiana	**585**	**3,370**	**3,955**	**30,668**	**72**	**102**	**174**	**1,772**
North	272	1,317	1,589	5,684	28	44	72	296
South	295	1,631	1,926	20,414	41	32	73	1,170
Offshore	18	422	440	4,570	3	26	29	306
Michigan	220	538	758	2,319	40	62	102	315
Mississippi	294	370	664	6,254	11	8	19	178
Montana	174	251	425	1,983	53	24	77	363
Nebraska	385	442	827	4,929	–25	–58	–83	–496
New Mexico	**336**	**1,609**	**1,945**	**8,221**	**76**	**–208**	**–132**	**–463**
East	239	712	809	2,934	33	–132	–99	–338
West	97	897	1,136	5,287	43	–76	–33	–125
New York	38	255	293	518	16	18	34	99
North Dakota	74	333	407	2,604	–10	–19	–29	–183
Ohio	34	1,020	1,054	2,713	–5	–74	–79	–205
Oklahoma	801	4,649	5,450	20,582	–26	117	91	286
Pennsylvania	28	812	840	2,381	7	185	192	303
South Dakota	16	33	49	359	6	20	26	184
Texas	**3,527**	**14,625**	**18,152**	**76,482**	**2**	**–376**	**–374**	**–1,660**
Dist. 1	304	885	1,189	3,048	–25	137	112	250
Dist. 2	243	513	756	4,714	11	–51	–40	–234
Dist. 3	312	925	1,237	8,526	78	–36	42	454
Dist. 4	324	1,008	1,332	6,940	–32	22	–10	–62
East (5 and 6)	274	942	1,216	5,321	22	–52	–30	–99
Dist. 7-B	605	1,813	2,418	6,997	–89	–116	–205	–614
West (7-C and 8)	725	4,438	5,163	25,513	–22	–309	–331	–1,625
Dist. 9	605	2,997	3,602	9,931	32	87	119	341
Dist. 10	135	1,104	1,239	5,492	27	–58	–31	–71
Utah	105	178	283	1,546	4	–39	–35	–192
West Virginia	33	794	827	2,100	4	17	21	39
Wyoming	364	648	1,012	4,986	–11	33	22	87
Miscellaneous	60	30	90	129	1	–1	....	–31
Total United States	**10,569**	**40,200**	**50,769**	**209,402**	**496**	**–620**	**–124**	**1,152**

*Thousands of feet.

. . . and Canada: 740 wildcats, 1,771 field wells

	1960 forecast				Change from 1959			
	Wildcat wells	Field wells	Total wells	Total footage*	Wildcat wells	Field wells	Total wells	Total footage*
Alberta	534	1,230	1,764	9,770	111	46	157	895
Saskatchewan	118	432	550	2,261	–82	–114	–196	–797
Manitoba	10	31	41	91	–1	1	....	....
British Columbia	73	77	150	818	17	26	43	230
Northwest Territories	5	1	6	24	1	1	2	8
Western Canada	740	1,771	2,511	12,964	46	–40	6	336

*Thousands of feet.



Well completions show 3.6% gain

TOTAL COMPLETIONS in the United States in 1959 numbered 50,893. This was an increase of 1,782 wells and 3.6% compared with a total of 49,111 wells for 1958, the year that total completions fell below the 50,000 mark for the first time since 1953.

The over-all drilling picture held steady throughout most of the year, the net increase being accounted for by regional spurts. Some areas where completions picked up included the Denver basin, which boosted Nebraska's total 25% in 1959; Mississippi, showing the largest percentage increase—62% in 1959, had an upturn in deep drilling throughout its oil areas, plus a major development—drilling play at Little Creek field. North and South Louisiana figures were up, while offshore drilling in that state held near the previous year's total.

Small increases in drilling in West Texas fields and in Southwest Texas, Texas Railroad Commission District 4, nudged Texas' total up 461 over last year, for an increase of 2.6%.

Kentucky's shallow play, which started in 1958, then more or less exploded in 1959, boosted the year's total to 3,365 (reported) completions, an increase of 1,228 wells and 57% over the previous year.

Wildcat decline is halted

THE DECLINE in exploratory drilling in the United States that began early in 1957 came to a welcome halt in 1959. Wildcatters completed 10,073 exploratory tests compared to 9,588 in 1958, 11,739 in 1957, and 13,034 in 1956, the peak year. The 1959 wildcat scoreboard shows 873 new oil pools, 113 condensate strikes, 340 gas discoveries, and 8,747 dry holes. Total wildcat footage drilled last year rose to 48,322,611 ft. compared to 44,576,670 ft. in 1958.

Wildcat wells accounted for 19.8% of all wells completed. This compares with 19.5% in 1958, 21% in 1957, and 22% in 1956.

... Average wildcat depth in 1959 was 4,797 ft. compared to 4,649 ft. in 1958.

How 59's wildcats fared

	Total	Per cent Oil	Cond.	Gas	Dry
Arkansas	146	10.3	0.0	6.2	83.5
California	402	8.0	0.0	6.7	85.3
Colorado	456	8.1	0.0	5.0	86.9
Illinois	391	12.0	0.0	0.3	87.7
Indiana	300	9.7	0.0	0.0	90.3
Kansas	1,066	11.4	0.0	4.1	84.5
Kentucky	389	11.3	0.0	1.0	87.7
Louisiana	513	7.4	3.1	3.5	86.0
Michigan	180	4.4	0.0	4.4	91.2
Mississippi	283	7.8	1.4	0.7	90.1
Montana	121	8.3	0.0	1.6	90.1
Nebraska	410	10.0	0.0	0.0	90.0
New Mexico	260	12.7	2.7	1.5	83.1
Oklahoma	827	11.7	2.4	8.8	77.1
Texas	3,525	6.8	1.8	1.7	89.7
Utah	101	6.9	0.0	6.9	86.2
Wyoming	375	5.6	0.3	5.6	88.5
Others	328	9.8	0.0	11.6	78.6
Total 1959	10,073	8.7	1.1	3.4	86.8
Total 1958	9,588	11.2	...	2.8	86.0

Total rundown on U. S. completions in '59

	Total	Crude	Cond.	Gas	Dry	Service	Total footage	Average footage	Comp. 1958
Alabama	95	70	0	0	25	0	947,308	9,972	76
Alaska	17	5	0	3	9	0	189,771	11,163	4
Arizona	27	2	0	1	24	0	97,187	3,600	19
Arkansas	842	462	0	41	334	5	2,864,672	3,402	836
California	1,530	884	0	73	512	61	7,342,849	4,799	1,476
Colorado	809	160	2	83	560	4	4,235,107	5,235	836
Florida	7	0	0	0	7	0	59,130	8,447	7
Illinois	2,357	1,009	0	9	1,062	277	5,136,175	2,179	2,419
Indiana	880	295	0	11	566	8	1,319,542	1,497	877
Iowa	1	0	0	0	1	0	2,236	2,236	0
Kansas	3,959	1,760	9	174	1,937	79	14,159,895	3,577	4,022
Kentucky	3,365	2,146	0	289	893	37	3,519,711	1,046	2,137
Louisiana	3,781	1,786	361	196	1,425	13	28,895,938	7,642	3,523
North	1,517	752	3	161	601	0	5,387,997	3,552	1,384
South	1,853	818	293	26	706	10	19,243,685	10,385	1,720
Offshore	411	216	65	9	118	3	4,264,256	10,375	419
Maryland	1	0	0	1	0	0	4,811	4,811	2
Michigan	656	241	0	54	308	53	2,004,168	3,055	436
Mississippi	645	251	30	2	362	0	6,076,185	9,420	398
Missouri	2	1	0	0	1	0	4,250	2,125	6
Montana	348	168	0	11	169	0	1,620,133	4,656	338
Nebraska	910	293	0	1	616	0	5,425,275	5,962	728
Nevada	2	0	0	0	2	0	8,519	4,259	1
New Mexico	2,077	1,239	52	359	414	13	8,684,313	4,181	1,910
West	908	410	43	334	112	9	3,271,897	3,603	.....
East	1,169	829	9	25	302	4	5,412,416	4,630	.....
New York	259	144	0	8	27	80	419,277	1,619	544
North Carolina	9	0	0	0	9	0	16,110	1,790	0
North Dakota	436	273	5	0	158	0	2,786,692	6,391	442
Ohio	1,133	484	0	297	274	78	2,918,361	2,576	1,049
Oklahoma	5,359	2,677	106	392	2,072	112	20,295,571	3,787	6,354
Oregon	2	0	0	0	2	0	3,148	1,574	1
Pennsylvania	648	160	0	327	67	94	2,078,276	3,207	652
South Dakota	23	13	0	0	10	0	175,198	7,617	15
Tennessee	58	5	0	0	53	0	43,642	752	24
Texas	18,526	10,204	687	779	6,453	403	78,141,614	4,218	18,065
Dist. 1	1,077	518	14	35	509	1	2,798,421	2,598	996
Dist. 2	796	196	115	108	376	1	4,947,950	6,216	726
Dist. 3	1,195	486	155	25	527	2	8,072,443	6,755	1,320
Dist. 4	1,342	399	145	161	622	15	7,001,602	5,217	1,160
East (5 & 6)	1,246	715	87	11	429	4	5,419,630	4,350	1,220
Dist. 7-B	2,623	1,240	17	59	1,262	45	7,610,594	2,901	2,575
West (7-C & 8)	5,494	4,035	60	68	1,216	115	27,137,567	4,939	5,153
Dist. 9	3,483	1,853	16	113	1,291	210	9,590,277	2,753	3,585
Dist. 10	1,270	762	78	199	221	10	5,563,130	4,380	1,330
Utah	318	183	0	16	119	0	1,737,551	5,464	383
Virginia	11	0	0	10	1	0	43,347	3,941	4
Washington	4	0	0	0	4	0	33,953	8,488	6
West Virginia	806	93	0	550	124	39	2,060,778	2,557	756
Wyoming	990	371	3	74	501	41	4,898,825	4,948	762
Total 1959	**50,893**	**25,379**	**1,255**	**3,761**	**19,101**	**1,397**	**208,249,518**	**4,092**	***49,111**
Total 1958	**49,111**	**24,137**	**1,125**	**3,674**	**18,822**	**1,353**	**197,383,985**	**4,019**	.....
Total 1957	**53,838**	**27,476**	**688**	**3,912**	**20,701**	**1,061**	**221,900,539**	**4,122**	.....
Total 1956	**58,160**	**30,730**	**428**	**4,115**	**21,838**	**1,049**	**233,902,000**	**4,022**	.....
Total 1955	**56,682**	**31,567**	.....	**3,613**	**20,742**	**760**	**226,270,000**	**3,992**	.....

*Incl. Georgia 1, Idaho 1, South Carolina 1. Note: Canadian data on page 350.

Completions in U. S.—Hits, misses, and months

Wildcat Completions

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Oil	88	84	76	65	71	66	82	75	67	56	67	76
Cond.	13	7	13	11	9	10	14	7	7	2	6	14
Gas	31	27	22	24	12	19	27	33	42	44	28	31
Dry	831	524	629	629	600	656	840	772	908	709	789	860
Total	963	642	740	729	692	751	963	887	1,024	811	890	981

Development Completions

Oil	2,215	1,688	1,819	2,023	1,998	2,206	2,256	1,945	2,000	1,917	2,208	2,231
Cond.	111	74	87	110	71	86	95	87	115	101	96	109
Gas	283	238	254	287	298	278	277	307	330	309	249	311
Dry	970	748	763	856	841	925	979	825	960	821	811	855
Service	112	100	104	100	116	89	158	86	159	156	99	118
Total	3,691	2,848	3,027	3,376	3,324	3,584	3,765	3,250	3,564	3,304	3,463	3,624

Total Completions

Oil	2,303	1,772	1,895	2,088	2,069	2,272	2,338	2,020	2,067	1,973	2,275	2,307
Cond.	124	81	100	121	80	96	109	94	122	103	102	123
Gas	314	265	276	311	310	297	304	340	372	353	277	342
Dry	1,801	1,272	1,392	1,485	1,441	1,581	1,819	1,597	1,868	1,530	1,600	1,715
Service	112	100	104	100	116	89	158	86	159	156	99	118
Total	4,654	3,490	3,767	4,105	4,016	4,335	4,728	4,137	4,588	4,115	4,353	4,605

Footage (1,000 ft.)

Wildcat	4,853	3,187	3,619	3,597	3,220	3,802	4,654	4,392	4,718	3,783	4,083	4,413
Development	14,871	11,453	12,413	13,489	12,870	13,212	15,008	13,234	14,872	12,831	12,560	13,112
Total	19,724	14,640	16,032	17,086	16,090	17,014	19,662	17,626	19,590	16,614	16,643	17,525

...Success ratio of all wildcats drilled in 1959 was 8.7% for oil, 1.1% for condensate, 3.4% for gas, and 86.8% for dry holes. The only category showing a gain over the previous year was condensate discoveries.

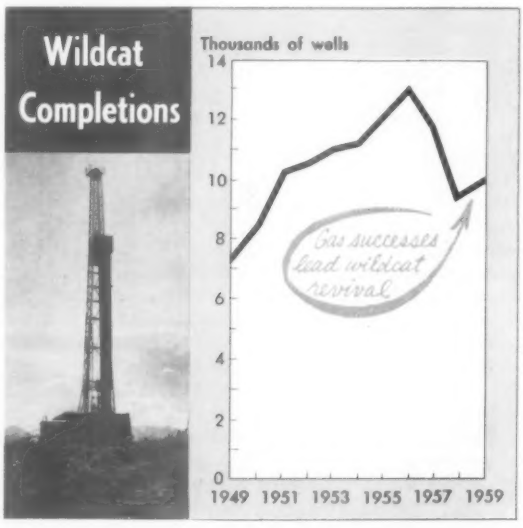
Oil Hunting—1959

Exploring for oil and gas in the United States last year netted some of the most significant discoveries in recent years in many provinces. Leading discovery areas were the Rocky Mountain states;

New drilling records

Producing..Ohio Fuel Oil Co. et al., Medina County, Ohio. Gas at 7,040 ft.
...Pure Oil Co. 1 Houston Farms Dev. Co., Galveston County, Texas. Gas-cond. at 16,132-16,264 ft.
...Texaco 16 Silverman, Wayne County, Illinois. Dev. at 5,326 ft.

Drilling...Indiana Farm Bureau Co-op. 1 Brown, Lawrence County, Indiana. Dry in granite at 6,806 ft.
...United Fuel Co. 1 James, Martin County, Kentucky. Dry at 13,172 ft.
...New York State Natural Gas Co. 1 Olin, Steuben County, New York. Dry at 13,500 ft.
...Union-Ohio 1 Kenai, Alaska. Dry at 14,676 ft.



Mid-Continent region; the Williston basin; East, South, and West Texas; California; Mississippi; Louisiana; Arkansas; the Eastern Interior, and Appalachian states.

Foreign explorers had their biggest year since the opening of the Middle East as an oil giant. Africa emerged as a major source of new oil, while drilling perked up in South America, in the Southeast Pacific region, France, Germany, and in Canada from the Maritimes to British Columbia.

In the Rockies. Once again this multistate province bagged the year's big newsmakers. The most significant single discovery of the year was in Utah's San Juan County at Pure Oil Co.'s 1 Northwest Lisbon. This wildcat got gas in the Mississippian, and Devonian oil . . . both being highly important to the future of the Paradox basin. Northwest Lisbon gave Paradox its third Mississippian gasser and the first Devonian oil in the Southwest Rockies.

The sister well to Northwest Lisbon is Southeast Lisbon, 15 miles away in San Miguel County, western Colorado. Pure found first Mississippian gas for Colorado at this wildcat.

Top discoveries in 1959—U. S., Canada, Overseas

Regionally in U. S.

PARADOX BASIN

Pure Oil Co.'s 1 Northwest Lisbon, San Juan County, Utah. Second Mississippian producer in Utah, third in basin, and first Devonian oil in Southwest Rockies.

SOUTHEAST

J. Willis Hughes and Sun Oil Co. 1 Pope et al. Unit, Pike County, Mississippi. Tuscaloosa oil discovery of McComb field looks like another Little Creek.

SOUTH TEXAS

Brazos Oil & Gas Division of Dow Chemical Co. 1 Person, Karnes County. First oil producer on "deep Edwards trend" and major extension.

WEST TEXAS

Mobil Oil Co. 1 Kathleen J. Moore, Pecos County. Deep Wolfcamp Permian oil discovery will shift interest for deep drillers to the southern part of the Delaware basin. Drill cut a 5,000-ft. section of Wolfcamp.

EAST TEXAS

Pan American Petroleum Corp. 1 Giraud, Cass County. First Cotton Valley Jurassic oil production in Texas.

ANADARKO BASIN

Mobil Oil Co. 1 Boyd Miller, Custer County, Oklahoma. First major Hunton Siluro-Devonian production in basin. Flow was 95,000 M.c.f.d. from 14,383-14,472 and 14,773-14,818 ft. First producer in Custer County.

GREEN RIVER BASIN

El Paso Natural Gas Products Co. 1 Patrick Draw Unit, Sweetwater County, Wyoming. Flowed 637 bbl. of oil daily from Almond Mesaverde Cretaceous. The confirmation well flowed 1,135 bbl. daily from Almond. This new field plus West Desert Springs, a Texas National Petroleum Co. discovery in the area, opened Almond oil production in Green River basin.

KAN-NEB BASIN

Skelly Oil Co. 1 Reiher, Hitchcock County, Nebraska, and Skelly 1 Cahoj to the southwest in Rawlins County, Kansas, hit prolific Pennsylvanian pay, setting off a furor of exploration throughout the newly labeled Kan-Neb basin.

MICHIGAN BASIN

Michigan's Albion, Pulaski, Scipio Trenton Ordovician trend in Calhoun, Jackson, and Hillsdale counties gave this basin a prolific new source of oil.

ILLINOIS BASIN

Charles Eager 1 W. L. Davis, Brown County, Illinois, a big Silurian producer at shallow depths put the northwest side of the basin in prime position for exploration. The well flowed nearly 1,000 bbl. per day on first tests from 8 in. of Edgewood lime.

. . . and world-wide

IN CANADA

Imperial Oil Ltd.'s Judy Creek Beaverhill Lake Middle Devonian discovery south of Swan Hills in Alberta. This big extension to the north country's oil giant flowed 926 bbl. per day and was swiftly developed.

Gulf States' Petitot River and Kotcho Lake Middle Devonian Slave Point gas discoveries in northeastern British Columbia emerged as the most significant strikes in Canada since the opening of Swan Hills.

Western Minerals 1 Chance, oil and gas discovery in the Yukon. This wildcat opened first oil production in the Territory, causing a stir of wildcatting interest at and north of the Arctic Circle.

Shell Oil Co. of Canada 10-1-63-26 Simonette River, Alberta. This Devonian D3 reef strike flowed 925 bbl. of oil daily, opening a major reef area for development.

OVERSEAS

The emergence of the Dark Continent as a major new oil province for the world. Giant oil finds in Algeria, Libya, and scattered discoveries in French Equatorial Africa set the stage for a new oil era in the Eastern Hemisphere.

There were significant discoveries in Europe's Paris basin, in West Germany, and on the other side of the world in the Philippines. Argentina enjoyed a busy oil search in South America.

Footage scoreboard on 1959 wells, by states

	FIELD WELLS					WILDCAT WELLS			
	Oil	Cond.	Gas	Dry	Service	Oil	Cond.	Gas	Dry
Alabama	802,786			23,299					121,223
Alaska	46,988		10,820	24,235		12,046		15,047	80,635
Arizona	5,513			6,520		6,080		6,645	72,429
Arkansas	1,324,922		153,123	770,617	10,000	69,307		50,242	486,461
California	3,630,757		206,952	952,512	259,608	246,047		140,983	1,905,990
Colorado	627,528	10,898	339,071	858,918	19,879	192,545		148,718	2,037,550
Florida									59,130
Illinois	2,257,519		6,120	1,620,088	489,996	123,851		621	637,980
Indiana	412,525		9,746	443,815	14,883	40,607			397,966
Iowa									2,236
Kansas	5,523,120	45,994	526,982	3,708,601	264,163	507,372	5,650	239,700	3,338,313
Kentucky	1,457,313		855,738	695,734	24,713	53,113		5,607	427,493
Louisiana	11,597,993	4,282,749	971,553	7,437,189	55,472	312,275	211,557	157,847	3,869,303
North	1,824,803	25,919	624,756	1,544,281		160,886		147,127	1,060,225
South	7,628,102	3,493,600	252,123	4,824,700	48,192	136,822	183,807	10,720	2,665,619
Offshore	2,145,088	763,230	94,674	1,068,208	7,280	14,567	27,750		143,459
Michigan	680,483		117,083	488,118	131,835	32,147		26,875	527,627
Missouri	1,460								2,790
Mississippi	2,304,626	258,128		918,882		238,620	38,781	10,947	2,306,201
Montana	770,092		27,147	244,754		51,632		5,597	520,911
Nebraska	1,505,919		5,225	1,494,456		248,966			2,170,709
New York	183,024		18,957	5,600	109,040			3,299	99,357
New Mexico	4,751,557	314,052	1,487,084	832,947	40,092	181,873	52,246	36,454	988,008
Nevada									8,519
North Carolina									16,110
North Dakota	1,689,503	58,486		537,469		127,103			374,131
Ohio	1,291,237		724,860	544,825	224,707	21,002		31,187	80,543
Oklahoma	9,008,342	647,997	1,811,168	4,467,367	264,570	597,866	162,849	486,259	2,849,153
Oregon									3,148
Pennsylvania	306,164		1,326,852	171,121	163,150			21,922	89,067
South Dakota	103,001			8,592		8,380			55,225
Tennessee	1,576			8,301		3,740			30,025
Maryland			4,811						
Texas	38,948,504	5,196,032	3,318,180	12,775,650	933,964	1,315,809	547,333	266,970	14,839,172
Dist. 1	1,004,468	125,002	160,187	493,965	2,130	33,685		6,989	971,995
Dist. 2	1,035,104	858,118	488,797	1,022,558	5,772	91,899	82,853	68,315	1,294,534
Dist. 3	2,618,599	1,361,978	140,804	1,905,169	6,822	68,605	251,399	19,962	1,699,105
Dist. 4	1,720,800	1,018,769	770,232	1,521,016	281,913	138,844	80,930	59,470	1,662,628
East	2,542,041	608,382	54,087	878,412	10,312	47,120	15,613		1,263,663
Dist. 7-B	3,298,376	46,877	133,614	1,756,006	77,140	234,743	23,893	58,726	1,981,219
West	19,397,156	498,975	342,076	2,589,439	323,510	359,411	32,504	29,971	3,564,525
Dist. 9	4,318,181	104,333	589,620	1,990,603	450,778	278,052		20,392	1,838,318
Dist. 10	3,013,779	573,598	638,763	618,482	28,587	63,450	60,141	3,145	563,185
Utah	994,808		31,693	158,863		52,405		33,064	466,718
Virginia			38,436	4,911					
Washington									33,953
West Virginia	190,036		1,315,927	284,600	126,969			103,567	39,679
Wyoming	1,631,356	17,173	319,231	719,439	79,523	113,418	7,360	160,877	1,850,448
Total 1959	92,048,652	10,831,509	13,626,759	40,207,423	3,212,564	4,556,204	1,025,776	1,952,428	40,788,203

... Other Paradox events. Northwest Lisbon was only one of several important wildcat happenings in the Four Corners last year. First Mississippian oil production was opened in Arizona (also the state's second oil well), the prolific Aneth area Pennsylvanian production moved east into southwestern Colorado with prolific discoveries at Towaoc and Flodine Park, while the big news in northwestern New Mexico was the upsurge of Dakota Cretaceous drilling and accompanying success.

... Wyoming. It was here that the remainder of Rocky Mountain wildcat news originated. Three basins, Green River, Wind River, and Powder River, stole the exploratory show. Important oil discoveries in the Desert Springs area of Sweetwater County (Patrick Draw and West Desert Springs) with production from the Almond Mesaverde Cretaceous sands marked the opening of a new era for Green River basin exploration. Primarily a gas bowl, the basin is now entering the oil age. Tertiary oil and gas and Upper Cretaceous gas and oil discoveries highlighted activities in Wind River basin. Focal points of this action were Lysite, Cooper Reservoir, and the Lost Cabin areas. Both Cretaceous and Pennsylvanian rocks proved their worth in northeastern Powder River basin. Important new fields in both zones were tapped in Crook, Weston, and Campbell counties in the northeastern part of the state.

In Williston. Three wells in this big basin became a trio of significant exploratory successes for lagging Williston developments. Dunn County's first oil producer was completed south of the Nesson anticline fields in North Dakota, stretching this producing trend to 70 miles or more, deep Mission

1959 completions—wildcats . . . and field wells

	Total	Crude	Cond.	Gas	Dry	Footage	Total	Crude	Cond.	Gas	Dry	Service	Footage
Alabama	23	0	0	0	23	121,223	72	70	0	0	2	0	826,085
Alaska	9	1	0	1	7	107,728	8	4	0	2	2	0	82,043
Arizona	25	1	0	1	23	85,154	2	1	0	0	1	0	12,033
Arkansas	146	15	0	9	122	606,010	696	447	0	32	212	5	2,258,662
California	402	32	0	27	343	2,293,020	1,128	852	0	46	169	61	5,049,829
Colorado	456	37	0	23	396	2,378,813	353	123	2	60	164	4	1,856,294
Florida	7	0	0	0	7	59,130	....	....	....	....	....	....	....
Illinois	391	47	0	1	343	762,452	1,966	962	0	8	719	277	4,373,723
Indiana	300	29	0	0	271	438,573	580	266	0	11	295	8	880,969
Iowa	1	0	0	0	1	2,236	....	....	....	....	....	....	....
Kansas	1,066	122	1	44	899	4,091,035	2,893	1,638	8	130	1,038	79	10,068,860
Kentucky	389	44	0	4	341	486,213	2,976	2,102	0	285	552	37	3,033,498
Louisiana	513	38	16	18	441	4,550,982	3,268	1,748	345	178	984	13	24,344,956
North	244	25	0	17	202	1,368,238	1,273	727	3	144	399	0	4,019,759
South	254	12	14	1	227	2,996,968	1,599	806	279	25	479	10	16,246,717
Offshore	15	1	2	0	12	185,776	396	215	63	9	106	3	4,078,480
Maryland	....	....	....	....	....	....	1	0	0	1	0	0	4,811
Michigan	180	8	0	8	164	586,649	476	233	0	46	144	53	1,417,519
Mississippi	283	22	4	2	255	2,594,549	362	229	26	0	107	0	3,481,636
Missouri	1	0	0	0	1	2,790	1	1	0	0	0	0	1,460
Montana	121	10	0	2	109	578,140	227	158	0	9	60	0	1,041,993
Nebraska	410	41	0	0	369	2,419,675	500	252	0	1	247	0	3,005,600
Nevada	2	0	0	0	2	8,519	....	....	....	....	....	....	....
New Mexico	260	33	7	4	216	1,258,581	1,817	1,206	45	355	198	13	7,425,732
West	64	9	5	2	48	257,701	844	401	38	332	64	9	3,014,196
East	186	24	2	2	168	1,000,880	973	805	7	23	134	4	4,411,536
New York	22	0	0	1	21	102,656	237	144	0	7	6	80	316,621
North Carolina	9	0	0	0	9	16,110	....	....	....	....	....	....	....
North Dakota	84	20	0	0	64	501,234	352	253	5	0	94	0	2,285,458
Ohio	39	7	0	8	24	132,732	1,094	477	0	289	250	78	2,785,629
Oklahoma	827	97	20	73	637	4,096,127	4,532	2,580	86	319	1,435	112	16,199,444
Oregon	2	0	0	0	2	3,148	....	....	....	....	....	....	....
Pennsylvania	21	0	0	4	17	110,989	627	160	0	323	50	94	1,967,287
South Dakota	10	1	0	0	9	63,605	13	12	0	0	1	0	111,593
Tennessee	40	2	0	0	38	33,765	18	3	0	0	15	0	9,877
Texas	3,525	238	64	59	3,164	16,969,284	15,001	9,966	623	720	3,289	403	61,172,330
Dist. 1	329	6	0	2	321	1,012,669	748	512	14	33	188	1	1,785,752
Dist. 2	232	13	9	14	196	1,537,601	564	183	106	94	180	1	3,410,349
Dist. 3	234	7	23	3	201	2,039,071	961	479	132	22	326	2	6,033,372
Dist. 4	356	21	12	10	313	1,941,872	986	378	133	151	309	15	5,059,730
East	252	8	2	0	242	1,326,396	994	707	85	11	187	4	4,093,234
Dist. 7-B	694	66	5	17	606	2,298,581	1,929	1,174	12	42	656	45	5,312,013
West	747	50	6	8	683	3,986,411	4,747	3,985	54	60	533	115	23,151,156
Dist. 9	573	58	0	4	511	2,136,762	2,910	1,795	16	109	780	210	7,453,515
Dist. 10	108	9	7	1	91	689,921	1,162	753	71	198	130	10	4,873,209
Utah	101	7	0	7	87	552,187	217	176	0	9	32	0	1,185,364
Virginia	....	....	....	....	....	....	11	0	0	10	1	0	43,347
Washington	4	0	0	0	4	33,953	....	....	....	....	....	....	....
West Virginia	29	0	0	23	6	143,246	777	93	0	527	118	39	1,917,532
Wyoming	375	21	1	21	332	2,132,103	615	350	2	53	169	41	2,766,722
Total 1959	**10,073**	**873**	**113**	**340**	**8,747**	**48,322,611**	**40,820**	**24,506**	**1,142**	**3,421**	**10,354**	**1,397**	**159,926,907**
Total 1958	9,588	920	158	273	8,237	44,576,670	39,523	23,217	967	3,401	10,585	1,353	152,807,315

Canyon Mississippian oil production was tapped at a remote wildcat in southeastern Sheridan County, eastern Montana, and at another remote test in an undrilled area of McKenzie County, 35 miles from any production. All three wildcats will set the stage for a new drive into the almost unknown central Williston reaches.

The Mid-Continent. This province had its biggest discovery year in a long time with significant strikes in Oklahoma, Kansas, and Nebraska, spilling over into southeastern Colorado and the Texas Panhandle.

In the Southeast. Mississippi's big noise was the discovery of McComb field, a possible new Little Creek, a new field in Hancock County on the other side of Wiggins anticline, and a continued growth of the Lower Cretaceous string of fields.

The East. Kentucky led the parade here once again with continued growth of the shallow oil boom in central and southern counties threatening to move south into Tennessee at year's end.

Ohio and other Appalachian states had their biggest year, both in completions and in successful drilling. Michigan's Trenton Ordovician trend grew to some 35 miles in length with two big wells blowing out, causing considerable stir in the area.

The Illinois basin turned up no big new plays, but the Brown County shallow strike in northwestern Illinois basin took the headlines.

Kentucky play again boosts nation's total of cable-tool wells

THE JOURNAL'S SURVEY of 1959 drilling operations in the United States reveals that once again cable-tool drilling rose to record heights. About 18.2% of all wells drilled last year were put down and completed with cable tools. This is an increase of 0.7% over 1958 when 17.5% of all wells were completed and drilled with cable-tool rigs. There were 9,270 wells drilled and completed with cable-tool rigs in 1959, compared to 8,617 in 1958, and 7,289 in 1957.

As has been the case for over 2 years, Kentucky's shallow boom is the main factor in the rapid upsurge of cable-tool drilling. This shallow play began in Green County in 1958, spread like prairie fire the rest of that year, fanned out in 1959 into 14 counties in the south-central part of Kentucky. Since the beginning of the shallow campaign in Kentucky more than 2,200 wells have been completed. Cable tools are being hauled in from other states, even North Carolina where they were used for water-hole drilling. This play is simmering down rapidly now, however, and the number of completions should show a decline in the coming months.

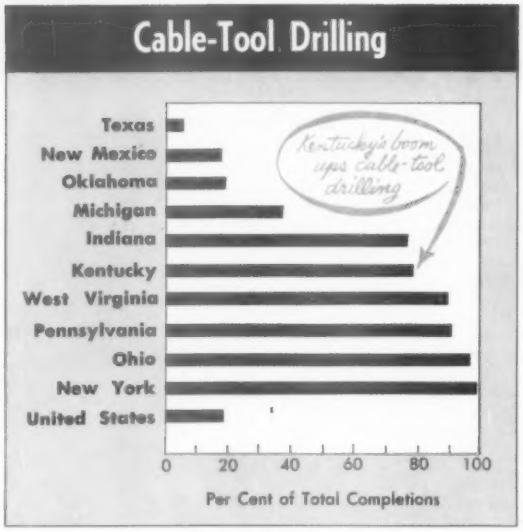
Mid-Continent. Oklahoma cable-tool drillers failed to come up with as large a number as the previous year, as the shallow play in Osage, Creek, and other eastern counties subsided. Total wells completed by cable tools hit 1,025 in 1959 compared to 1,358 the previous year.

Texas had 1,061 cable-tool wells compared to 1,059 the previous year for no gain. Kansas reported 157 cable-tool wells compared to 101 the previous year. An increase was noted in Illinois and Indiana.

Eastern. Michigan drillers reported 249 cable-tool completions compared to 269 the previous year, mainly due to the active rotary-rig play in the Scipio trend in the southern part of the state.

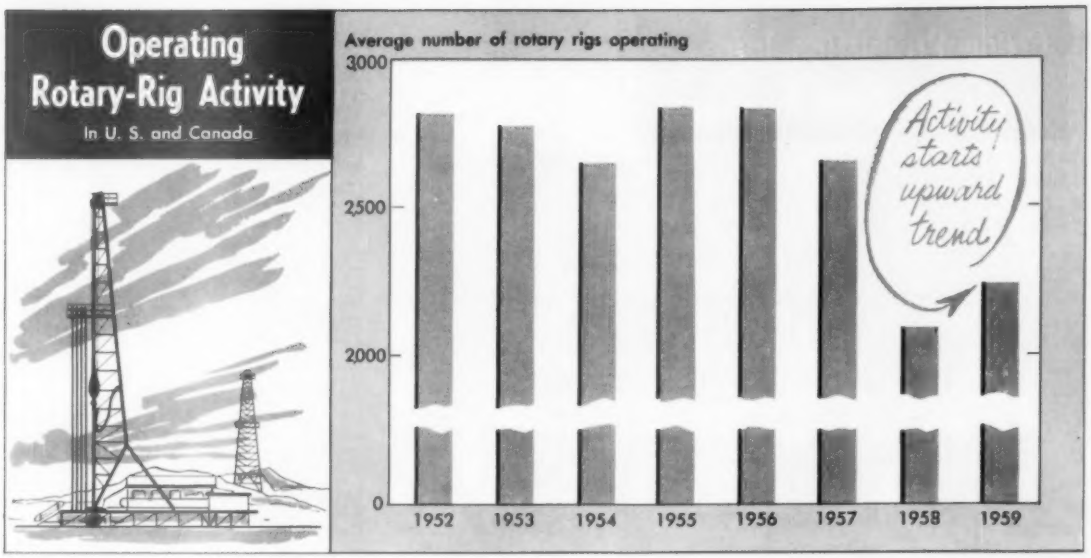
What Lies Ahead?

With the Kentucky play becoming mature at this date we can expect a drop in cable-tool completions in 1960 unless another boom should pop up in Kentucky, or possibly in some other state. There are definite signs of increased drilling in northern Tennessee . . . if someone hits oil, the scramble will be on as in Kentucky. Oklahoma is steadily losing cable-tool rigs due to the considerable drop in shallow activity in the past 3 years. This, too, could change.



Cable-rotary score by states

	Cable	Rotary	Total comp.
Alabama	0	95	95
Alaska	0	17	17
Arizona	4	23	27
Arkansas	0	842	842
California	9	1,521	1,530
Colorado	0	809	809
Florida	0	7	7
Illinois	225	2,132	2,357
Indiana	672	208	880
Iowa	0	1	1
Kansas	157	3,802	3,959
Kentucky	2,651	714	3,365
Louisiana	0	3,781	3,781
Maryland	1	0	1
Michigan	249	407	656
Mississippi	0	645	645
Missouri	2	0	2
Montana	30	318	348
Nebraska	0	910	910
Nevada	0	2	2
New Mexico	363	1,714	2,077
New York	258	1	259
North Carolina	9	0	9
North Dakota	0	436	436
Ohio	1,100	33	1,133
Oklahoma	1,025	4,334	5,359
Oregon	2	0	2
Pennsylvania	595	53	648
South Dakota	0	23	23
Tennessee	58	0	58
Texas	1,061	17,465	18,526
Utah	0	318	318
Virginia	11	0	11
Washington	0	4	4
West Virginia	725	81	806
Wyoming	63	927	990
Total, 1959	9,270	41,623	50,893
Total, 1958	8,617	40,494	49,111
Total, 1957	7,289	46,549	53,838



Rotary rigs averaged 19½ wells in '59

ON THE WHOLE, 1959 was a much busier year for rotary rigs than 1958. Except for a couple of months at the beginning of the year and a few weeks at the close, the number of rotaries in operation during the year ran consistently above those working during the preceding year. At times, through midyear, there were as many as 400 to 435 more rigs active than at corresponding times of the preceding year. The average for the year was 155 above that of 1958.

Rotary rigs drilled 43,980 of the 53,250 reported completed wells in both the United States and Canada during the year. This represented an average of 19.59 wells per rig, a slight decrease from the 20.52-well of 1958 with a total of 42,900 wells completed in the two countries.

Rotary drilling dropped to its lowest level of the year the first week of February. The 1,996 rotary rigs reported active at that time still lacked 126 rigs of equaling 1958's lowest number of 1,870 rigs reported running the last of April.

Rotary-rig activity by years

(United States and Canada)

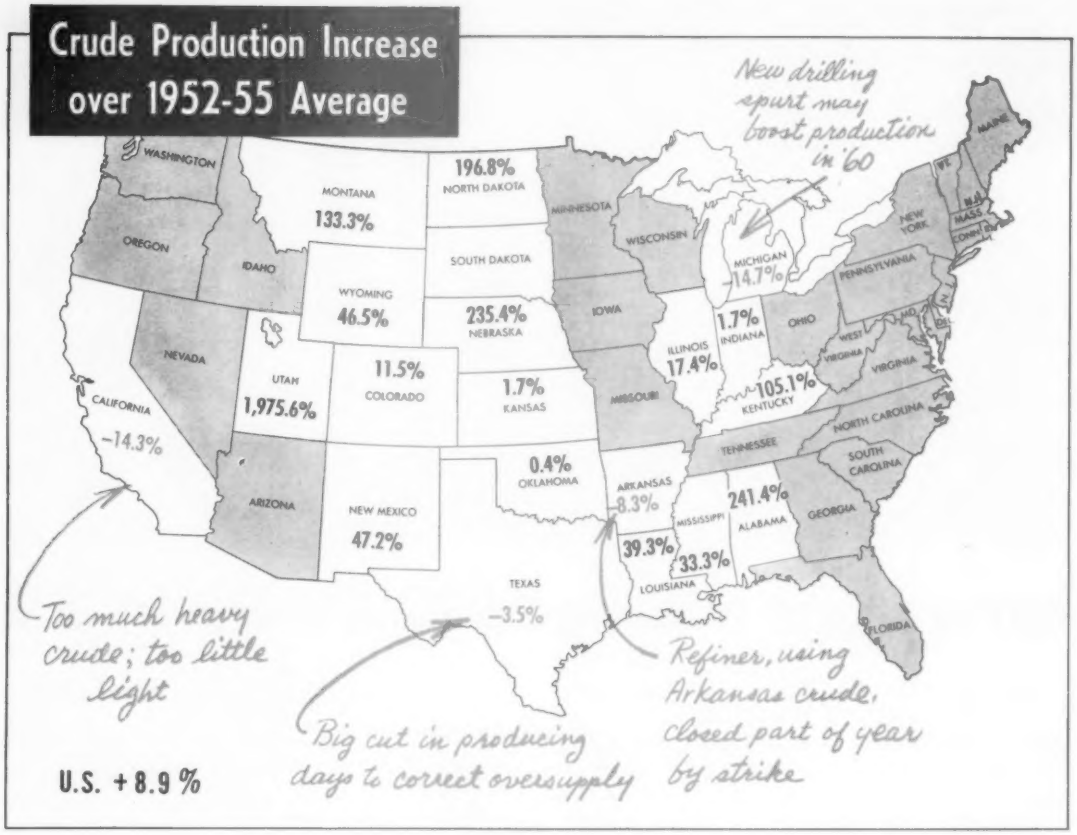
Year	No. rigs*—Jan. 1	No. rigs*—Dec. 31	Peak No.	Low No.	Avg. No.
1959	2,198	2,136	2,436	1,996	2,245
1958	2,373	2,364	2,565	1,870	2,090
1957	2,617	2,518	2,842	2,355	2,624
1956	3,023	2,759	3,132	2,619	2,843
1955	2,683	3,084	†3,338	2,574	2,856
1954	2,735	2,830	2,963	2,439	2,657
1953	2,775	2,795	3,079	2,580	2,779
1952	2,973	2,801	3,032	2,470	2,815

*Based on Hughes Tool Co. weekly average figures. †All-time record number.

Rotary-rig activity by states

State—	No. rigs*—Jan. 1	No. rigs*—Dec. 31	Avg. No.	Peak No.	Low No.
Alabama	8	5	7	9	5
Arkansas	15	13	14	21	7
California	87	87	93	104	70
Colorado	31	39	43	64	22
Ill.-Ind.-Ky.	50	50	51	67	9
Kansas	141	139	138	164	109
Louisiana	329	297	332	381	296
North	37	32	37	50	21
South Onshore	260	211	246	293	209
Offshore	32	54	49	63	32
Michigan	12	41	26	42	10
Mississippi	57	77	67	87	51
Montana	18	22	22	31	16
Nebraska	19	29	25	36	14
New Mexico	102	113	113	138	93
North Dakota	33	30	30	47	15
Oklahoma	194	194	226	259	176
Pennsylvania-Eastern†	17	21	20	27	13
Texas	784	655	750	800	655
South	156	181	186	224	133
North-East	168	165	166	206	141
West Central	301	210	251	301	189
West	159	99	147	166	99
Utah	35	30	32	40	24
Wyoming	68	63	74	98	48
Others	5	8	11	17	5
Total U. S.	2,005	1,913	2,074	‡2,284	‡1,996
Canada	193	223	171	232	109
Total	2,198	2,136	2,245	‡2,436	‡1,996

*Based on Hughes Tool Co. weekly figures. †Includes New York, Ohio, West Virginia, and Maryland. ‡From U. S. and Canada weekly totals.



Crude production up ⅓ million barrels

A SIZABLE INCREASE in crude production was recorded in 1959. The production figure of 7,045,000 bbl. daily was 336,000 bbl. more than the 1958 production of 6,709,000 bbl. daily. This increase regained 72.4% of the decrease suffered in 1958 but still left the 1959 figure 125,000 bbl. daily under 1957 production and 106,000 bbl. daily below production in 1956. Both 1956 and 1957 were unusually high production years because of high exports necessitated by the Suez crisis.

The 1959 production figure represented a 5% increase over 1958. Here are some of the factors that influenced the increase in production.

... **Total demand** was up 3.3% in 1959. Exports continued to follow the downward trend of the past few years by recording a 12.3% drop, bringing the total to 242,000 bbl. daily. Domestic demand showed an increase of 3.7% totaling 9,421,000 bbl. daily and combined with the export cut to produce a 305,000-bbl.-daily gain in total demand.

... **An increase** of 19,000 bbl. daily in total stocks of all oils was recorded in 1959 after a 1958 decrease of 140,000 bbl. daily. Crude stocks were lowered by 28,000 bbl. daily in 1959. Product stocks dropped 88,000 bbl. daily in 1958, after high figures were recorded in 1957, and were raised 47,000 bbl. daily in 1959. There is expected to be a cut in product stocks and an increase in the crude-stock figure creating a slight drop in total stocks of all oils in 1960.

There were also factors that limited crude production in 1959.

... **Imports** increased 3.6% or 61,000 bbl. daily. Both crude and product imports recorded a gain. Crude was up less than 1% but the product import figure was boosted slightly over 7%. The increase was the result of heavy importing in the first quarter which wasn't under the mandatory quotas.

... **Gas-liquid production** for the year was up 2,812,000 gal. daily or 8.3% compared to the 5% gain in crude production.

A breakdown of crude production in 1959 shows that two high-producing states, California and Oklahoma, were among the 10 states recording lower production in 1959 than in 1958. California has dropped for 6 years running and Oklahoma has had three straight decreases.

Of the 15 states reporting increases, Utah, Lou-

U. S. production of crude oil and lease condensate

(Thousands of barrels)

	1959 prod. change	1959	1958	1957	1956	1955	1954	1953	Cum. Prod.
Alabama	– 787	5,100	5,887	5,406	3,069	1,411	1,584	1,694	29,079
Arkansas	– 1,963	26,737	28,700	31,047	29,355	28,369	29,130	29,681	1,058,496
California	– 6,235	307,437	313,672	339,646	350,754	354,812	355,865	365,085	11,721,331
Colorado	– 1,736	47,000	48,736	54,982	58,516	52,653	46,206	36,402	548,058
Florida	– 24	425	449	461	479	495	548	543	6,162
Illinois	– 2,184	78,091	80,275	77,083	82,346	81,423	66,798	59,026	2,151,877
Indiana	95	11,959	11,864	12,662	11,513	10,988	11,204	12,823	306,974
Kansas	360	120,302	119,942	123,614	124,204	121,669	119,317	114,566	3,196,481
Kentucky	9,812	27,321	17,509	17,029	17,628	15,518	13,791	11,518	395,879
Louisiana	40,629	354,520	313,891	329,896	299,421	271,010	246,558	256,632	5,106,377
Michigan	942	10,250	9,308	10,169	10,740	11,266	12,028	12,285	425,472
Mississippi	8,451	47,963	39,512	38,922	40,824	37,741	34,240	35,620	631,769
Montana	1,993	29,950	27,957	27,172	21,760	15,654	14,195	11,920	335,382
Nebraska	2,898	23,271	20,373	19,586	16,204	11,203	7,783	6,344	116,017
Nevada	6	46	40	44	64	64	33	.....	291
New Mexico	7,079	105,594	98,515	94,759	87,893	82,958	74,820	70,441	1,408,215
New York	220	1,983	1,763	2,677	2,748	2,904	3,257	3,800	194,229
North Dakota	3,651	17,910	14,259	13,259	13,495	11,143	6,025	5,183	82,848
Ohio	– 657	5,603	6,260	5,478	4,785	4,353	3,880	3,610	661,422
Oklahoma	– 5,968	194,731	200,699	214,661	215,862	202,817	185,851	202,570	8,032,664
Pennsylvania	– 411	6,061	6,472	8,179	8,230	8,531	9,107	10,649	1,215,272
Texas	41,068	981,234	940,166	1,073,867	1,107,808	1,053,297	974,275	1,019,164	22,910,502
Utah	14,919	39,730	24,811	4,367	2,466	2,227	1,905	1,807	82,067
West Virginia	– 2	2,184	2,186	2,215	2,179	2,320	2,902	3,038	463,343
Wyoming	10,291	125,863	115,572	109,584	104,830	99,483	93,533	82,618	1,785,274
Other States	144	313	169	136	110	119	153	63	3,020
Total U. S.	**122,591**	**2,571,578**	**2,448,987**	**2,616,901**	**2,617,283**	**2,484,428**	**2,314,988**	**2,357,082**	**62,868,501**
Daily average	**336**	**7,045**	**6,709**	**7,170**	**7,151**	**6,807**	**6,342**	**6,458**	.....

isiana, Texas, and Wyoming accounted for 87.2% of the total increase.

Texas showed an increase in 1959 but only because of the big production cut in 1958. Texas crude total for 1958 was the lowest since 1950. The 1959 total was lower than production figures for 6 out of the last 8 years.

Oklahoma's production total for 1959 was lower than for 5 out of the last 6 years.

High per cent increases were recorded in Utah and Kentucky. Activity in the Green County area raised Kentucky production 56%. This area was relieved of the prevailing transportation problem by the completion of a pipeline to the Ohio River allowing direct movement to barges. Drilling in the Four Corners area stepped up Utah production by 60.1%.

The crude-production situation for 1960 shapes up as follows:

... **Domestic demand** gains are expected for each product and add to a 4.8% increase in domestic demand for all oils.

... **Exports drop 4.8%** and combine with the domestic demand gains to place the total demand figure at 10,103,000 bbl. daily.

... **No cut back** is needed in stocks. Crude-stocks expected to increase slightly.

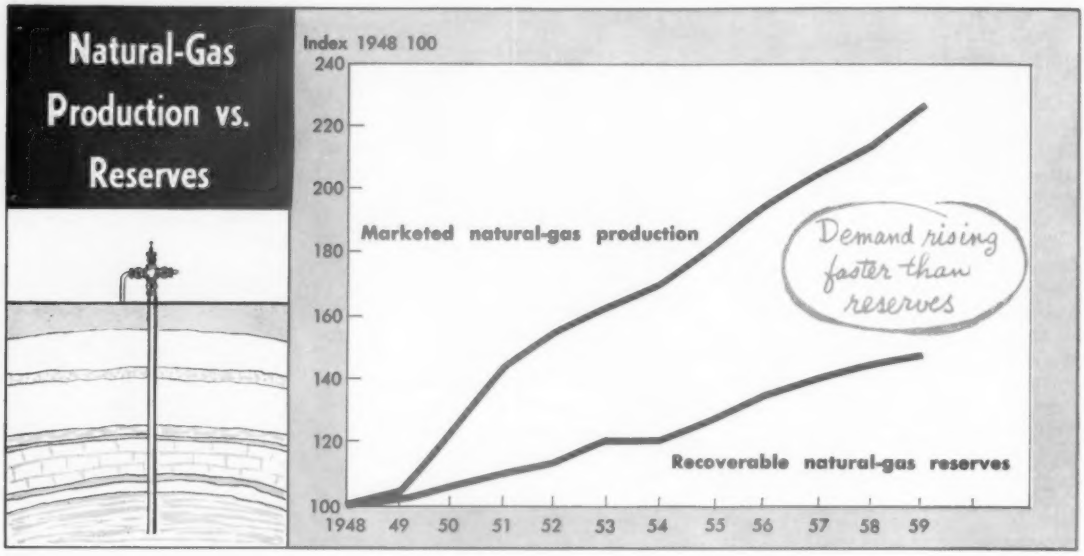
... **Imports up** but not enough to limit production.

... **Gas-liquids** production up 4%.

... **An increase** in crude production of 4.7% to a record of 7,376,000 bbl. daily.

Production per well by states

	Bbl. daily 1959	Producing wells	Daily avg. per well
Alabama	13,973	310	45.1
Arkansas	73,252	6,075	12.1
California	842,293	37,663	22.4
Colorado	128,767	2,325	55.4
Florida	1,164	11	105.8
Illinois	213,948	31,977	6.7
Indiana	32,764	5,282	6.2
Kansas	329,595	39,376	8.4
Kentucky	74,852	19,395	3.9
Louisiana	971,288	23,205	41.9
Michigan	28,082	4,165	6.7
Mississippi	131,405	2,385	55.1
Montana	82,055	3,920	20.9
Nebraska	63,756	1,505	42.4
Nevada	126	4	31.5
New Mexico	289,299	12,249	23.6
New York	5,433	17,244	0.3
North Dakota	49,068	1,335	36.8
Ohio	15,351	15,515	1.0
Oklahoma	533,510	79,867	6.7
Pennsylvania	16,605	56,271	0.3
Texas	2,688,312	193,260	13.9
Utah	108,849	698	155.9
West Virginia	5,984	14,325	0.4
Wyoming	344,830	7,230	47.7
Other states	858	185	4.6
Total U. S.	**7,045,419**	**575,777**	**12.2**



Gas reserves are lagging consumption

THE PAST YEAR was no great shakes as a record setter. In the natural-gas industry certain factors offered encouragement. Total gas completions were on the rise again after a 2-year slump—yet the upswing was not sharp. A total of 3,761 gas wells were drilled with 3,421 field wells and 340 wildcats.

Marketed production of natural gas showed a 6.7% gain over 1958. Average annual increase during the past 11 years was 7.9%. On the other hand, proved gas reserves only went up 2.6%, and their rate of progression in the same 11-year period was 3.7% yearly. At the present rate of gas consumption (11.7 trillion cubic feet) our reserves will last only 22 years at the present figure of 260.7 trillion cubic feet. In 1949, reserves at the rate of consumption then represented almost a 33-year supply. The point is simply this—**more gas must be found** to satisfy future anticipated needs.

Proved reserves of natural-gas liquids were up 4.6%, an increase of nearly 285 million barrels. Natural-gas-liquids reserves have nearly doubled since 1948. Natural-gas consumption has more than

Dozen states produce 98.3% of U. S. natural gas

(Millions of cubic feet)

	1959	Per cent change over 1958	1958	Per cent change over 1957	1957	Per cent change over 1956	1956	Cumulative 1906-1959	Cum. per cent of U. S.
Texas	5,515,000	6.5	5,178,073	0.4	5,156,215	3.1	4,999,889	70,475,184	41.40
Louisiana	2,811,900	14.7	2,451,587	17.9	2,078,901	10.2	1,886,302	26,300,262	15.45
New Mexico	778,000	2.2	761,446	5.3	723,004	15.4	626,340	6,602,659	3.88
Oklahoma	680,600	−2.3	696,504	−3.2	719,794	6.1	678,603	15,112,600	8.88
Kansas	535,300	−4.7	561,816	−4.2	586,690	11.5	526,091	7,861,520	4.62
California	460,000	−1.2	465,582	−5.4	492,338	−2.4	504,458	14,925,068	8.77
West Virginia	208,700	2.0	204,581	1.1	202,440	−1.1	204,717	10,021,828	5.89
Mississippi	166,900	4.2	160,143	−5.8	169,967	−8.2	185,137	1,877,336	1.10
Wyoming	123,200	1.2	121,682	3.8	117,256	38.9	84,398	1,922,717	1.13
Pennsylvania	96,400	0.6	95,869	−5.8	101,801	−2.6	104,508	5,608,112	3.29
Colorado	90,500	9.7	82,464	−13.4	95,259	75.7	54,205	600,874	0.35
Kentucky	74,800	3.5	72,248	3.2	70,024	−5.0	73,687	2,011,263	1.18
Subtotal	11,541,300	6.4	10,851,995	3.2	10,513,689	5.9	9,928,335	163,319,423	95.94
Other States	199,300	11.8	178,253	7.0	166,569	8.5	153,588	6,913,186	4.06
Total U. S.	**11,740,600**	**6.4**	**11,030,248**	**3.3**	**10,680,258**	**5.9**	**10,081,923**	**170,232,609**	**100.00**

Not much change in gas completions . . . or reserves

State—	1958 Field wells	1958 Successful wildcats	1959 Field wells	1959 Successful wildcats	Change in total wells
Arkansas	26	11	32	9	4
California	29	10	46	27	34
Colorado	60	20	60	23	3
Illinois	43	6	8	1	− 40
Indiana	11	5	11	0	− 5
Kansas	205	23	130	44	− 54
Kentucky	135	4	285	4	150
Louisiana	196	18	178	18	− 18
Michigan	19	8	46	8	27
Mississippi	1	1	0	2	0
Montana	1	5	9	2	5
Nebraska	0	0	1	0	1
New Mexico	482	9	355	4	−132
New York	8	7	7	1	− 7
North Dakota	0	0	0	0	0
Ohio	242	7	289	8	48
Oklahoma	300	40	319	73	52
Pennsylvania	272	9	323	4	46
Texas	800	55	720	59	− 76
Utah	13	4	9	7	− 1
Virginia	4	0	10	0	6
West Virginia	499	13	527	23	38
Wyoming	54	12	53	21	8
Miscellaneous	1	6	3	2	− 2
Total United States	**3,401**	**273**	**3,421**	**340**	**87**

(Billion cubic feet at 60° F. and 14.65 psia.)

Jan. 1, 1959*	Jan. 1, 1960	Change
1,388	1,488	100
8,967	9,080	113
2,349	2,325	− 24
171	147	− 24
31	29	− 2
20,234	21,200	966
1,215	1,245	30
55,112	59,000	3,888
498	562	64
2,598	2,700	102
682	690	8
143	107	− 36
21,180	19,500	−1,680
96	97	1
1,124	1,235	111
818	865	47
15,207	16,240	1,033
870	895	25
115,046	116,500	1,454
1,058	1,250	192
38	39	1
1,558	1,559	1
3,650	3,880	230
109	115	6
254,142	**260,748**	**6,606**

*American Gas Association figures as of Jan. 1, 1959.

doubled in the last 11 years, while gas reserves have only increased 49% in the same interim.

Where are the active gas areas? Of the dozen leading gas-producing states, New Mexico, down 132; Texas, down 76; and Kansas, down 54, had the biggest losses in total gas completions from last year. Sizable advances were tallied by Kentucky, Oklahoma, and California.

The outlook for the gas industry is excellent. With demand up, there will be more pure gas exploration. Until recently, much gas exploration has been a sideline of operators seeking oil who would hesitantly take gas only in preference to a dry hole. The future will highlight a direct effort of more of the operators to definitely seek gas.

. . . **Appalachian.** An old producing area that has been revitalized is the story of this eastern province. Deeper drilling in established sectors and wildcatting of fringe outposts on established trends have accounted for new interest and reevaluation of exploration and development programs in West Virginia, Pennsylvania, Ohio, and New York.

. . . **West Coast.** The biggest news this year has been the noteworthy gas strikes in the Sacramento Valley. Both development and continued interest in additional reserves have kept the operators busy.

. . . **Rockies.** Wyoming persists as the queen of the Rockies. The Green River basin is still the hot spot. The Cretaceous-Mesaverde formation continues to be a prolific gas reservoir. Interest prevails in the expansion of Desert Springs, Big Piney, and LaBarge fields and environs.

. . . **Four Corners.** Last year the San Juan basin continued to reward its operators with amazing regularity. However, some of the glitter was stolen by the gas find of Pure Oil Co.'s 1 Northwest Lisbon in the Paradox basin of southeastern Utah. A fine gas pay was uncovered in the Mississippian before the well was completed as a Devonian oil well.

. . . **Mid-Continent.** The Oklahoma and Texas panhandles continue to draw top interest of the region. Exploration with excellent results is spreading in all directions from prolific Hugoton field. The play that started a few years ago in Beaver County, Oklahoma, has gone east into northwestern Oklahoma. Last year there was a great deal of activity in southwestern Kansas and late in the year a significant new strike was found by Frankfort Oil Co. in southeastern Colorado. This Bent County find was an oiler, but previous tests in this part of the Las Animas arch have found gas, which suggests the possibility of good hidden reserves. Perhaps the most overlooked gas potential lies in the Arkoma basin of eastern Oklahoma and northwestern Arkansas. A thick section and numerous pays there will require greater drilling density to evaluate. Currently, the density of drilling in this large two-state geologic province is surprisingly low.

. . . **Gulf Coast.** The Upper Gulf Coast of Texas has paid off handsomely. The Frio gas sands have bolstered Texas' gas reserves. Jefferson and Chambers counties remain consistently active. The nearshore parishes of Louisiana continue to turn up new gas.

Estimated proved recoverable reserves

A few more barrels in the Bank!

(Thousands of barrels—primary recovery)

State—	Proved reserves 1-1-59	1959 discoveries	1959 revisions and extensions	1959 production	Proved reserves As of 1-1-60	Year's change	Per cent of U. S.
Alabama	34,150	0	20,100	5,100	49,150	15,000	0.1
Arkansas	360,800	2,500	35,737	26,737	372,300	11,500	1.1
California total	*4,305,000	14,000	383,437	307,437	4,395,000	90,000	12.9
Coastal	922,000	3,700	81,582	76,282	931,000	9,000	2.7
Los Angeles	1,123,000	1,200	74,377	92,577	1,106,000	–17,000	3.3
San Joaquin	*2,260,000	9,100	227,478	138,578	2,358,000	98,000	6.9
Colorado	355,000	30,500	62,500	47,000	401,000	46,000	1.2
Illinois	707,000	5,000	45,091	78,091	679,000	–28,000	2.0
Indiana	74,000	3,000	9,959	11,959	75,000	1,000	0.2
Kansas	1,039,000	18,000	74,302	120,302	1,011,000	–28,000	3.0
Kentucky	176,000	5,000	49,321	27,321	203,000	27,000	0.6
Louisiana total	5,238,000	62,000	534,463	327,463	5,507,000	269,000	16.2
North	789,000	5,000	35,945	46,945	783,000	–6,000	2.3
South	2,956,000	52,000	360,412	226,412	3,142,000	186,000	9.2
Offshore	1,493,000	5,000	138,106	54,106	1,582,000	89,000	4.7
Michigan	90,000	11,250	12,000	10,250	103,000	13,000	0.3
Mississippi	412,000	52,000	85,138	46,138	503,000	91,000	1.5
Montana	432,000	5,000	30,950	29,950	438,000	6,000	1.3
Nebraska	133,000	10,000	20,271	23,271	140,000	7,000	0.4
New Mexico	936,000	75,000	150,337	104,337	1,057,000	121,000	3.1
New York	59,721	0	0	1,983	57,738	–1,983	0.2
North Dakota	347,000	15,000	39,910	17,910	384,000	37,000	1.1
Ohio	57,800	1,000	16,603	5,603	69,800	12,000	0.2
Oklahoma	2,228,000	50,000	120,731	194,731	2,204,000	–24,000	6.5
Pennsylvania	120,000	0	561	6,061	114,500	–5,500	0.3
Texas total	14,754,000	66,000	343,026	942,026	14,221,000	–533,000	41.8
East	2,612,000	10,000	39,614	103,614	2,558,000	–54,000	7.5
Gulf Coast	3,112,000	11,000	49,866	165,866	3,007,000	–105,000	8.8
North	1,127,000	15,000	69,634	122,634	1,089,000	–38,000	3.2
Panhandle	555,000	5,000	55,071	39,071	576,000	21,000	1.7
Southwest	1,326,000	10,000	25,579	82,579	1,279,000	–47,000	3.8
West	6,022,000	15,000	103,262	428,262	5,712,000	–310,000	16.8
Utah	387,000	10,000	150,730	39,730	508,000	121,000	1.5
West Virginia	51,000	0	1,784	2,184	50,600	–400	0.1
Wyoming	1,499,000	35,000	69,863	125,863	1,478,000	–21,000	4.3
Others†	7,500	1,000	‡19,738	738	27,500	20,000	0.1
Total U. S.	**33,802,971**	**471,250**	**2,276,552**	**2,502,185**	**34,048,588**	**245,617**	**100.00**

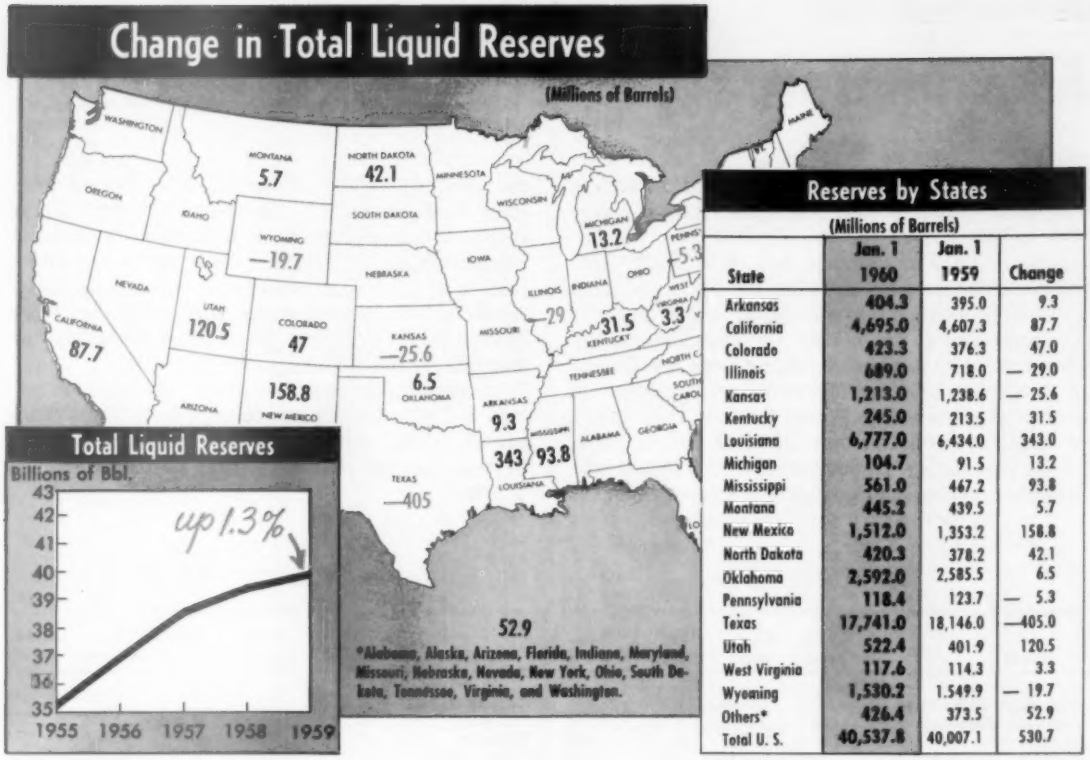
*Adjusted. †Alaska, Arizona, Florida, Maryland, Missouri, Nevada, South Dakota, Tennessee, Virginia, and Washington. ‡Alaska, South Dakota, and Arizona.

Liquid reserves 40.54 billion barrels

THINGS PICKED UP in new crude-oil discovery in the United States during 1959; but discovery of natural gas liquids lagged. Estimates of new crude reserves uncovered during the year were just a bit higher than in 1958, but the net gain in natural-gas liquids shrank a good deal.

The gross addition to the reserves of crude oil and natural-gas liquids amounted to 3,518 million barrels; of this, 2,848 million was crude and 670 million natural-gas liquids. Deducting total production of 2,887 million barrels, the net gain stands at 531 million barrels for the year. This is 31 million less net gain than in the preceding year.

A further breakdown reveals that 245.6 million net gain was made in crude and 285.2 million in natural-gas liquids.



Reserves by States

(Millions of Barrels)

State	Jan. 1 1960	Jan. 1 1959	Change
Arkansas	404.3	395.0	9.3
California	4,695.0	4,607.3	87.7
Colorado	423.3	376.3	47.0
Illinois	689.0	718.0	— 29.0
Kansas	1,213.0	1,238.6	— 25.6
Kentucky	245.0	213.5	31.5
Louisiana	6,777.0	6,434.0	343.0
Michigan	104.7	91.5	13.2
Mississippi	561.0	467.2	93.8
Montana	445.2	439.5	5.7
New Mexico	1,512.0	1,353.2	158.8
North Dakota	420.3	378.2	42.1
Oklahoma	2,592.0	2,585.5	6.5
Pennsylvania	118.4	123.7	— 5.3
Texas	17,741.0	18,146.0	—405.0
Utah	522.4	401.9	120.5
West Virginia	117.6	114.3	3.3
Wyoming	1,530.2	1,549.9	— 19.7
Others*	426.4	373.5	52.9
Total U. S.	40,537.8	40,007.1	530.7

Estimated proved reserves of natural-gas liquids

Includes condensate, natural gasoline, and liquefied petroleum gases

(Thousands of barrels)

State—	Proved reserves* 1-1-59	1959 discoveries	1959 revisions and extensions	1959 production	Proved reserves As of 1-1-60	Proved reserves Year's change	Proved reserves Per cent of U. S.
Arkansas	34,150	400	455	3,005	32,000	–2,150	0.5
California	302,319	731	26,100	29,150	300,000	–2,319	4.6
Colorado	21,268	100	1,827	945	22,250	982	0.4
Illinois	10,950	5	1,910	1,865	10,000	–950	0.2
Indiana	119	0	13	20	112	–7	...
Kansas	199,552	500	7,924	5,976	202,000	2,448	3.1
Kentucky	37,472	1,850	5,232	2,554	42,000	4,528	0.6
Louisiana	1,195,955	50,000	80,475	56,430	1,270,000	74,045	19.6
Michigan	1,502	60	220	112	1,670	168	...
Mississippi	55,182	750	5,052	2,984	58,000	2,818	0.9
Montana	7,497	8	68	373	7,200	–297	0.1
Nebraska	5,699	0	225	674	5,250	–449	0.1
New Mexico	417,238	1,500	57,606	21,344	455,000	37,762	7.0
North Dakota	31,239	0	6,549	1,488	36,300	5,061	0.6
Ohio	1,618	10	263	21	1,870	252	...
Oklahoma	357,507	6,200	58,696	34,403	388,000	30,493	6.0
Pennsylvania	3,685	120	228	108	3,925	240	0.1
Texas	3,391,967	110,000	231,447	213,414	3,520,000	128,033	54.2
Utah	14,899	10	–503	6	14,400	–499	0.2
West Virginia	63,286	3,600	6,001	5,887	67,000	3,714	1.0
Wyoming	50,876	1,200	3,986	3,862	52,200	1,324	0.8
Others	38	1	3	3	39	1	...
Total U. S.	**6,204,018**	**177,045**	**492,777**	**384,624**	**6,489,216**	**285,198**	**100.0**

*Source: American Gas Association.

Journal survey of proved reserves

ON THESE PAGES are the estimated remaining reserves of crude oil and condensate for the larger fields of the United States. Eligibility for this list requires a 1959 production rate of at least 1,000 bbl. per calendar day; in Texas, the list is restricted to those producing 3,000 bbl. per allowable day.

Those major fields with an ultimate-recovery estimate of 100 million barrels or more are flagged by an asterisk and are included here regardless of daily production today; Powell field, in East Texas, for instance, produced only 272,000 bbl. in 1959, but its cumulative production of 126,894,000 bbl. certainly qualifies it to go down in history as one of our great oil fields. There are now 221 of these giant fields on record. The largest of them all, of course, is famous East Texas field, with a cumulative production of 3.4 billion barrels and a remaining reserve of 1.7 billion barrels; this means an ultimate figure of more than 5 billion barrels for the largest field in the U. S. These giant fields are marked with asterisks in the following tables.

Figures in these tables are in thousands of barrels, and refer to primary recovery only. The "Number of Wells" figure includes those producing oil or lease condensate. All figures are as of January 1, 1960.

ARKANSAS

Field—	1959 prod.	Cum. prod.	Est. reserve	No. wells
Champagnolle-Rainbow	452	20,930	9,070	134
Dorcheat-Macedonia	369	20,258	4,742	75
El Dorado[1]	1,034	73,225	11,775	608
Fouke	960	18,190	9,810	160
Horsehead	501	3,050	2,950	33
Kiblah[2]	508	2,828	3,172	53
Lewisville	380	3,101	2,899	76
*Magnolia	4,384	99,387	74,613	113
McKamie-Patton	1,016	22,520	41,480	44
Midway	2,067	42,097	30,903	45
Nevada (Irma)	370	10,711	4,289	146
*Schuler[3]	2,098	87,532	18,468	208
*Smackover	4,265	465,842	39,158	1,762
Stamps	411	1,606	4,394	72
Stephens & Center[4]	1,655	34,235	15,765	780
Urbana[5]	850	17,568	15,432	529
Village	433	19,561	4,439	107
Wesson	1,615	35,514	14,486	266

(1) El Dorado includes: Sheppard, El Dorado, South, and El Dorado, East. (2) Kiblah includes: Bradley, West. (3) Schuler includes: Schuler, East, Schuler, South, and Trull. (4) Center & Stephens Cons. May 1959. (5) Urbana includes: Lawson, South, and Sandy Bend.

APPALACHIAN

*Allegany	1,341	156,270	28,730	
*Bradford	4,826	604,732	52,268	

CALIFORNIA

Coastal Region				
Aliso Canyon	1,874	33,333	21,667	117
Bardsdale	632	8,715	9,285	104
Casmalia	577	20,242	6,758	63
Castaic Junction	1,522	10,403	19,597	55
*Cat Canyon, West	3,690	94,111	45,889	298
Del Valle	423	21,218	5,782	67
*Elwood	726	99,951	10,049	38
Fillmore	1,552	7,698	17,302	44
Gato Ridge	690	25,904	9,096	45
Guadalupe	641	6,273	18,727	62
Honor Rancho	2,220	13,127	26,873	43
Lompoc[1]	357	29,425	10,575	100
Montalvo, West	2,550	11,261	28,739	50
Newhall-Potrero	2,660	51,272	28,728	126
Oakridge	414	5,471	6,529	31
*Orcutt	975	121,596	13,404	252
Oxnard	3,206	16,813	38,187	106
Placerita	1,127	31,239	13,761	322
Ramona	435	15,364	5,636	123
*Rincon	3,864	69,381	45,619	335
*San Ardo	11,010	90,704	134,296	675
San Miguelito	1,345	44,514	20,486	126
*Santa Maria Valley	1,954	130,431	29,569	350
Saticoy	1,785	8,090	26,910	51
*South Mountain	7,375	80,440	74,560	464
Torrey Canyon[1]	270	11,930	18,070	66
*Ventura	18,876	622,835	202,165	1,095
Zaca Creek	639	13,085	8,915	38

(1) Field shut in or production restricted during part of year.

Los Angeles Basin				
Bandini	425	3,124	5,876	51
Belmont Offshore	1,070	3,675	16,325	34
Beverly Hills	830	7,893	17,107	27
*Brea-Olinda	5,865	270,128	69,872	632
*Coyote, East	1,730	80,226	19,774	276
*Coyote, West	2,330	192,916	37,084	304
*Dominguez	3,446	222,148	42,852	334
*Huntington Beach	18,212	651,057	198,943	1,697
*Inglewood	4,296	216,700	53,300	527
*Long Beach	5,869	817,954	62,046	1,140
*Montebello	1,311	169,974	15,026	307
Newport West	1,312	25,109	16,891	250
Playa del Rey	365	59,724	5,276	117
*Richfield	2,074	135,645	24,355	410
Rosecrans	999	78,607	11,393	204
Sansinena	2,223	26,073	38,927	142
*Santa Fe Springs	3,364	575,739	39,261	557
*Seal Beach	3,397	157,005	42,995	261
Sunset Beach	370	5,103	4,897	74
*Torrance	2,638	154,507	35,493	790
Whittier	548	25,271	6,729	154
*Wilmington	26,974	856,408	303,592	2,847
Yorba Linda	1,444	9,604	20,396	220
San Joaquin Valley				
Antelope Hills[1]	348	7,958	4,042	43
Bellevue, West	398	945	4,055	8
Belgian Anticline	2,204	27,167	22,823	145
Belridge, North	444	65,063	6,937	88
*Belridge, South	4,182	79,408	50,592	1,294
*Buena Vista	9,769	480,155	119,845	1,131
*Coalinga, East	5,082	322,581	62,419	1,005
*Coalinga, Nose	13,918	312,158	162,842	100
*Coalinga, West	2,517	187,682	32,318	934
*Coles Levee, North	4,815	103,947	56,053	168
Coles Levee, South[2]	811	19,057	10,943	35

Field—	1959 prod.	Cum. prod.	Est. reserve	No. wells
CALIFORNIA (Continued)				
*Cuyama, South	12,590	127,123	147,873	217
*Cymric	2,972	72,977	37,023	508
*Edison	3,570	83,763	36,237	745
*Elk Hills	5,154	252,570	†147,430	‡280
*Fruitvale	2,523	76,989	28,011	418
Gosford, East	2,023	8,208	21,792	73
*Greeley	2,659	82,632	32,368	48
Guijarral Hills	2,555	36,561	25,439	90
Helm	878	19,516	10,484	69
Jacalitos	366	18,053	3,947	107
Kern Front	2,189	95,284	24,716	695
Kern River	6,195	349,719	75,281	3,048
Kettleman North Dome	3,857	426,049	48,951	270
Lost Hills	1,274	83,369	16,631	554
McDonald Anticline	522	4,293	5,707	57
McKittrick	1,276	105,746	14,254	307
Midway-Sunset	13,157	869,416	155,584	3,615
Mount Poso	2,662	124,640	30,360	435
Mountain View	1,396	65,589	19,411	230
Premier	1,308	26,287	16,713	312
Pyramid Hills	396	5,036	4,964	163
Raisin City	1,663	25,638	17,362	135
Rio Bravo	3,466	93,056	41,944	83
Riverdale	396	15,049	4,951	34
Rosedale Ranch	459	3,892	5,108	43
Round Mountain	1,056	49,264	13,736	208
Russell Ranch	1,951	51,007	33,993	158
San Emidio Nose	1,145	1,249	13,751	15
Strand	927	10,404	11,596	30
Tejon-Grapevine	1,112	17,845	15,155	187
Tejon Hills	495	9,895	6,105	217
Tejon North	3,257	4,276	45,724	45
Ten Section	1,625	62,942	19,058	114
Vallecitos	853	2,167	9,833	25
Wheeler Ridge	2,040	20,448	24,552	150
Other fields	4,123	185,607	59,077	1,235

(1) Field shut in or production restricted during part of year. (2) Does not include condensate. †Adjusted reserve estimate. ‡Does not include 670 shut-in producers.

SOUTHEASTERN STATES

ALABAMA				
Citronelle	4,426	15,044	34,956	223
Pollard	707	6,061	4,939	35
FLORIDA				
Sunniland	423	6,112	3,888	11
MISSISSIPPI				
*Baxterville	5,801	71,925	28,075	190
Bolton	1,369	5,250	19,750	47
Brookhaven	1,928	50,034	24,966	130
Bryan	1,222	1,249	18,751	28
Church Hill	716	5,699	4,301	31
*Cranfield	805	44,276	55,724	108
Diamond	1,040	2,040	7,960	27
Eucutta	1,533	27,698	12,302	134
*Heidelberg	3,262	54,904	55,096	212
Idlewilde	396	2,432	7,568	16
LaGrange and South	1,755	34,444	15,556	115
Lake Mary	459	1,627	8,373	16
Little Creek	5,460	6,885	45,115	125
Mallalieu	761	29,070	10,930	38
Martinsville	729	1,276	6,724	15
Maxie-Pistol Ridge	1,207	5,746	19,254	191
Overton (and North)	548	3,549	4,451	25
Raleigh	2,138	2,666	17,334	40
Sandersville	390	1,519	8,481	21
Soso	4,695	22,612	37,338	119
*Tinsley	3,421	156,807	43,193	261
Yellow Creek, W., E., & N.	1,292	16,789	13,211	135

TRISTATE

ILLINOIS				
Albion	1,113	20,180	14,820	403
Allendale	508	10,682	4,318	401
Benton	529	35,097	6,903	237
Boyd	485	13,543	4,457	110
*Bridgeport (Old)	6,264	277,279	27,721	3,650
Centralia	2,160	47,603	16,397	557
*Clay City	7,269	211,874	88,126	3,416
*Dale	1,979	65,846	34,154	1,092
Golden Gate[1]	444	11,514	8,486	322
Herald	485	10,415	12,585	367
Inman, East	1,126	17,205	13,795	348
Iola	675	10,883	9,117	206
Johnsonville	1,698	34,194	13,806	376
Kincaid	654	3,595	14,405	98
*Loudon	12,586	235,394	64,606	2,101
Mount Auburn	1,031	2,593	7,407	155
*New Harmony	4,758	99,905	45,095	1,825
Phillipstown	606	18,394	6,606	398
*Robinson (Old)	3,197	180,047	29,953	6,700
Roland[2]	1,860	37,526	15,474	635
Sailor Springs	1,378	32,084	9,916	789
*Salem	6,926	271,507	78,493	2,380
Storms	375	8,609	11,391	222
West Frankfort	413	3,773	6,227	79

(1) Ellery cons. with Golden Gate, Feb. 1959. (2) Roland includes Iron, Gossett and Roland—cons. Nov. 1958.

INDIANA				
Griffin	2,134	46,717	13,283	650
Mount Vernon[1]	368	9,137	4,863	164
Springfield[2]	805	9,740	4,260	275
Union-Bowman[3]	1,299	10,713	9,287	573
Old Indiana[4]	1,380	35,590	9,410	950

(1) Mount Vernon and West Hovey South—cons. Mar. 1959. (2) Springfield includes Solitude, West—cons. Mar. 1959. (3) Union-Bowman includes Arda—cons. Mar. 1959; Peterson, West, cons. Mar. 1959; Rumble, West, cons. Mar. 1959. (4) Old Indiana includes Evansville, Cannelburg, and Spencer areas.

KENTUCKY				
Apex	869	4,103	6,897	435
Birk City	492	8,267	6,773	406
Glenville	399	1,939	6,061	133
Greensburg	7,200	8,944	11,056	2,200
Poole	1,265	17,278	12,722	545
Smith Mills, North	453	4,118	8,882	49
Uniontown	506	17,072	3,928	242

MICHIGAN

Coldwater	642	19,290	5,710	81
Kawkawlin	508	11,116	3,884	405
Reed City	514	42,209	7,791	177
Reynolds	580	2,598	2,402	54
Scipio	1,331	1,858	11,142	65

LOUISIANA

NORTH LOUISIANA				
Benton	660	13,334	4,666	13
Bethany (Longstreet)	953	4,023	10,977	75
*Caddo[1]	6,334	251,487	148,513	6,450
Catahoula Lake, West[2]	627	6,444	7,556	60
Colquitt	783	4,252	5,748	42
Cottage Grove	372	2,265	3,735	82
*Cotton Valley[3]	2,804	98,812	16,188	275
*Delhi[4]	5,433	105,126	119,874	285
DeSoto (Red River)[5]	612	66,219	8,781	375
Esperance Point	1,347	9,323	14,677	57
Greenwood-Waskom	948	7,102	17,898	342
*Haynesville[6] (Ark. & La.)	1,744	133,024	21,976	332
Haynesville, East	728	14,962	10,038	128
*Homer	586	86,325	13,675	321
Killens Ferry	547	1,050	8,950	40
Knowles-Hico	440	11,910	14,090	47
*Lake St. John	1,842	72,335	42,665	98
Lisbon	1,130	34,037	27,963	225
Locust Ridge	997	3,654	12,346	30
Nebo	1,504	44,158	15,842	159
Olla[7]	1,329	43,456	11,544	160
*Rodessa[8]	1,399	125,477	59,523	341
Rodney Island	702	2,373	2,627	20
Ross Bayou	417	3,120	3,880	26

Field—	1959 prod.	Cum. prod.	Est. reserve	No. wells
NORTH LOUISIANA (Continued)				
Shangaloo-No. Red Rock[9]	1,106	6,120	12,880	141
Sligo[10]	1,564	16,904	11,096	180
Urania-Georgetown	797	39,817	5,183	360

(1) Caddo includes: Dixie and Rock Point. (2) Catahoula Lake, West, includes: Rogers. (3) Cotton Valley includes: Cotton Valley, North, and distillate production. (4) Delhi includes: Big Creek, and South, Delhi, Delhi, South and West. (5) De-Soto includes: Bull Bayou, Gahagan, Grogan, and Red River. (6) Includes Arkansas portion. (7) Olla includes: Olla, West—cons. Nov. 1958—and Waggoner. (8) Includes Texas portion. (9) Shangaloo includes: Red Rock, and Red Rock, East, Shangaloo, North. (10) Sligo and Sligo, East—cons. Nov. 1958.

SOUTH LOUISIANA—ONSHORE				
Anse la Butte	1,787	41,907	19,093	144
Avery Island	2,696	39,042	38,938	90
Avondale, West	512	5,256	5,744	23
Bancroft & No. & So.	517	13,707	16,293	27
Barataria, West	376	12,083	7,917	17
Bastian Bay	1,152	6,797	9,203	41
Bateman Lake	3,171	24,089	33,911	84
Bay de Chene	1,894	12,314	22,686	74
Bay St. Elaine	3,965	37,488	31,512	139
Bayou Bleu	747	16,814	9,186	82
Bayou Choctaw	1,412	14,421	16,579	70
Bayou Couba	623	8,579	9,421	42
Bayou des Allemands	746	10,960	5,040	42
Bayou des Glaize	572	6,251	3,749	17
Bayou Fordoche	556	4,177	9,823	20
Bayou Mallet & So.	929	14,226	13,774	62
Bayou Pigeon	563	3,173	4,827	26
*Bayou Sale	2,961	64,451	37,549	107
Bayou Sorrel	1,274	4,890	15,110	39
Bayou White	419	3,794	8,206	17
Big Bayou Pigeon	431	1,519	6,481	15
Big Lake	712	4,151	7,849	32
Belle Isle†	749	5,110	19,890	34
Black Bay, East	397	1,653	10,347	16
Black Bay, West	3,030	6,048	33,952	114
Black Bayou	454	22,922	15,078	28
Bon Air	386	4,099	3,901	14
Bonnet Carre	760	907	9,093	26
Bosco	653	36,485	9,515	29
Breton Sound, Blk. 20	434	2,668	8,332	15
Bully Camp	1,500	14,728	18,272	72
Burrwood	436	1,108	4,892	14
*Caillou Island†	15,062	143,156	74,844	446
Cameron	394	1,799	7,201	13
Cameron Meadows	464	15,928	14,072	30
Cankton, North	750	11,668	18,332	58
Chacahoula	1,145	26,965	20,035	72
Charenton	1,372	31,582	21,418	160
Church Point	458	1,892	10,108	21
Clear Creek	1,128	4,592	29,408	42
Clovelly	1,091	6,821	17,179	35
Cote Blanche Bay, West	2,318	30,518	23,482	101
Cote Blanche Island	1,386	5,186	8,814	37
Cowpen Creek	502	2,530	21,470	32
Cox Bay	2,081	21,387	21,613	66
Crowley, North	955	31,177	13,823	62
Deep Lake	944	2,888	12,112	57
Delacroix Island	804	9,851	5,149	28
Delta Duck Club	1,376	11,991	9,009	64
*Delta Farms	3,242	81,162	28,838	118
Delta Farms, West	433	4,249	17,751	18
Dog Lake	776	17,222	8,778	43
Duck Lake	2,533	23,662	24,338	70
Egan	1,815	30,596	8,404	57
Ellis	543	3,978	13,022	27
*Erath	4,091	79,968	70,032	92
Fausse Point	1,661	12,856	22,144	60
Fordoche	610	8,354	13,646	35
Four Isle	367	3,143	1,857	17
Franklin	712	3,510	10,490	24
Garden Island Bay	1,633	30,040	19,960	100
Gibson, East & N.E.	919	36,001	8,999	61
Gillis-English Bayou	420	28,258	13,742	46
*Golden Meadow	2,446	73,127	36,873	250
Good Hope	853	24,756	13,244	34
*Grand Bay	3,113	64,276	42,724	136

Field—	1959 prod.	Cum. prod.	Est. reserve	No. wells
SOUTH LOUISIANA—ONSHORE (Continued)				
Grand Coulee	748	1,877	9,123	28
Grand Lake	942	17,299	12,701	43
Gueydan and West	1,092	31,838	10,162	67
Hackberry, East	754	49,567	18,433	78
*Hackberry, West	4,238	63,636	70,364	206
Happytown	388	2,158	9,842	17
Horseshoe Bayou	756	16,607	16,393	24
Hurricane Creek	412	6,017	15,983	35
Iberia	728	51,009	8,991	60
*Iowa	1,569	88,810	38,190	92
Jeanerette	1,211	25,969	18,031	70
*Jennings	848	109,940	22,060	118
Kent Bayou	580	3,726	7,274	16
Kinder	722	4,193	23,807	44
Krotz Springs	2,170	13,246	13,754	35
*Lafitte	3,253	97,665	52,335	118
Lake Barre	4,458	33,532	50,468	111
Lake Chicot	788	16,748	6,252	28
Lake Hatch	521	2,262	5,738	21
Lake Long	451	12,612	5,388	18
Lake Mongoulois	607	9,853	11,147	27
Lake Palourde, East	2,358	6,698	20,302	49
Lake Pelto	4,099	37,104	40,896	116
Lake Salvador	2,124	29,616	26,384	78
Lake Verret, West	1,257	24,967	20,033	60
*Lake Washington†	10,902	51,841	158,159	343
La Pice	732	13,665	14,335	36
La Rose	1,149	4,942	12,058	36
*Leeville	3,905	69,030	40,970	185
Little Lake	2,462	14,205	40,795	72
Little Temple	781	1,627	8,373	21
Live Oak	860	3,047	7,953	23
Lockport	760	25,115	20,885	72
Main Pass, Blk. 35	3,285	23,323	49,677	84
Napoleonville	736	6,353	14,647	44
Neale	488	16,591	11,409	39
Opelousas	635	2,637	12,363	6
Orange Grove	446	1,958	8,042	16
*Paradis	2,554	61,572	38,428	86
Patterson	762	1,870	10,130	31
Pecan Lake, South	538	2,551	16,449	31
Perry Point	496	553	5,447	19
Phoenix Lake	1,050	12,060	15,940	47
Pine Prairie	591	21,545	7,455	72
Plumb Bob	608	4,606	4,394	24
Pointe-a-la-Hache	1,397	19,424	18,576	59
Port Barre	771	30,295	13,705	61
Potash	465	10,439	4,561	30
*Quarantine Bay	2,949	62,699	49,301	123
Raceland	636	12,783	9,217	25
Roanoke	411	19,663	6,337	24
Romere Pass	2,797	32,236	35,764	67
Saturday Island	568	945	8,055	14
Section 28	1,153	15,296	21,704	79
Shuteston	906	10,110	19,890	43
Southeast Pass	403	2,781	7,219	15
*South Pass, Blk. 24†	16,423	84,704	200,296	521
St. Gabriel	534	26,540	13,460	37
Stella	385	5,669	12,331	17
Sweet Bay Lake	1,019	3,610	12,390	31
Sweet Lake	488	14,443	5,557	30
Tepetate	453	20,861	4,139	42
Tepetate, North	390	10,175	17,825	45
Tepetate, West	618	19,196	4,804	27
Thornwell, South	562	1,786	10,214	12
Tigre Lagoon	609	6,132	3,868	20
*Timbalier Bay†	10,220	44,892	112,108	295
University	580	41,770	14,230	48
Valentine	1,621	20,171	28,829	91
*Venice	4,404	80,657	52,343	133
Ville Platte	836	52,615	24,385	93
*Vinton	1,729	92,881	37,119	149
Washington	1,704	5,014	19,986	31
*Weeks Island	7,476	89,686	101,314	179
*West Bay	4,957	45,124	54,876	202
West Delta, Blk. 53†	1,044	4,823	17,177	14
West Delta, Blk. 83	2,443	3,181	46,819	45
White Castle	898	27,028	13,972	38
White Lake, East	1,066	21,670	26,330	48
White Lake, West	627	5,877	10,123	26

†Combined onshore and offshore.

Field—	1959 prod.	Cum. prod.	Est. reserve	No. wells
OFFSHORE LOUISIANA				
*Bay Marchand, Blk. 2†	6,093	32,155	67,845	199
Eugene Island, Blk. 18	1,223	3,933	21,067	31
Eugene Island, Blk. 32	1,046	4,992	20,008	27
*Eugene Island, Blk. 126	3,396	17,495	107,505	70
Eugene Island, Blk. 128	1,776	4,947	35,053	41
Eugene Island, Blk. 188	721	854	9,146	18
Grand Isle, Blk. 16	2,410	5,336	44,664	57
Grand Isle, Blk. 18	1,818	11,225	27,775	32
Grand Isle, Blk. 47	3,340	6,014	53,986	58
*Main Pass, Blk. 69	7,417	38,161	161,839	180
Ship Shoal, Blk. 154	1,814	4,623	35,377	42
*South Pass, Blk. 27	5,620	13,732	96,268	147
South Timbalier, Blk. 86	381	452	4,548	5
West Cameron, Blk. 45	530	1,976	13,024	20
*West Delta, Blk. 30	6,314	14,978	115,022	173
OKLAHOMA				
*Allen	1,676	86,690	13,310	924
Atlantic	1,047	10,576	9,424	153
*Avant	311	103,405	3,595	588
Bald Hill[1]	701	58,996	4,004	774
Beebe-Konawa	606	31,335	5,665	458
*Bowlegs	665	139,072	10,928	181
Bradley	2,898	15,282	14,718	182
Bradley, East	478	1,932	5,068	23
*Burbank	14,463	362,839	112,161	2,517
Cache Creek	910	17,116	6,884	315
Camrick	579	1,500	8,500	91
*Cement	4,222	97,618	27,382	1,538
Chickasha	577	4,326	7,674	224
Criner, East	472	958	9,042	34
Cumberland	1,407	55,988	19,012	139
*Cushing	2,585	410,748	44,252	1,826
Davenport	855	25,025	9,975	305
Dilworth	453	17,902	15,098	350
Dora	1,315	10,474	9,526	128
Doyle	2,241	26,837	25,163	324
*Earlsboro	279	135,479	4,521	92
Edmond, Northeast[2]	676	14,314	10,686	220
*Edmond, West	1,013	109,460	20,540	550
*Elk City	2,113	52,421	67,579	304
*Eola (Robberson)[3]	3,863	45,005	54,995	441
Falls, Northeast	416	1,678	4,322	35
*Fitts	910	115,843	9,157	443
Flat Rock	472	46,372	13,628	575
Flint Creek	448	840	9,160	50
Garber	876	65,822	7,178	555
*Glenn Pool	3,164	262,064	27,936	1,830
*Golden Trend	10,627	177,322	122,678	1,992
Guthrie Lake, East	440	2,252	11,748	121
Happy Valley	506	4,232	10,768	90
*Healdton	2,256	234,304	15,696	2,095
Henderson	408	1,399	4,601	67
*Hewitt	2,977	157,994	27,006	1,439
Holdenville	412	15,793	12,207	524
Hoover, North	1,198	16,867	14,133	493
Hoover, Southeast	841	2,144	2,856	25
Iron Post	1,021	14,999	8,001	450
Joiner City, West	394	698	9,302	34
Jones	663	7,714	5,286	142
Komalty Dist.	471	1,277	6,723	344
Knox[4]	941	35,556	23,444	404
Lauderdale	531	19,734	7,266	298
Lindsay, Northwest	456	2,787	3,213	22
*Little River	390	129,987	5,013	141
Lone Elm, South	431	769	4,231	78
Loco	1,290	21,510	13,490	938
Lucien	749	44,662	7,338	206
Madill, North	586	3,192	6,808	75
Mannford	479	12,275	7,725	525
Moore, West	1,527	16,231	33,769	312
Mount Vernon	798	4,729	5,271	77
Mount Vernon, Southwest	462	3,203	6,797	124
Naval Reserve	1,667	32,665	16,335	490
*Oklahoma City	3,050	713,781	56,219	564
Olympic	1,101	34,899	6,101	372
Oscar	656	17,709	7,291	272
Pauls Valley	472	23,907	4,093	74
Payne, Northeast[5]	1,226	2,191	17,809	67
Payson	423	6,147	8,853	190
Pearsonia	424	2,200	7,800	53
Peavine (see Edmond, Northeast)[2]				
Robberson (see Eola)[3]				
*Seminole	797	163,800	11,200	285
*Sho-Vel-Tum	25,175	524,721	275,279	7,240
Slick	451	41,111	6,889	295
*St. Louis	1,379	189,717	11,283	540
Stroud[6]	545	24,932	5,068	441
*Tonkawa	306	127,213	2,787	125
Tonkawa, East[7]	456	1,497	8,503	68
Washington, East	396	3,028	2,972	12
Wewoka[8]	983	54,276	8,724	393
Wildhorse	503	21,465	4,535	420
Yale-Quay	1,700	43,798	13,202	340
Northeast Stripper Area	9,508	477,301	97,699	11,900

(1) Bald Hill, Pine, Link, cons. Apr. 1959. (2) Edmond, Northeast, includes North and East Edmond and Peavine. (3) Eola-Robberson, cons. Aug. 1959. (4) Wrights Corner, North, cons. with Knox Mar. 1959. (5) Payne, cons. with Payne, Northeast, Dec. 1958. (6) Big Pond, West, cons. with Stroud Dec. 1958. (7) Tonkawa, East, includes Autwine, South, Tonkawa, East and Northeast—cons. Mar. 1959. (8) Wewoka includes Fish, Northwest, Lima, Southeast, Wewoka and Wewoka, Southwest—cons. Dec. 1958.

KANSAS

Barry	517	9,880	4,120	65
*Bemis-Shutts	4,943	171,047	178,953	1,100
Bloomer	897	50,270	14,730	273
Boyd	391	9,165	2,835	127
Browning	806	10,795	10,205	132
Burrton-Haury	606	52,149	4,851	332
Catherine South	391	3,087	2,913	62
*Chase-Silica	3,732	217,257	42,743	1,313
Chitwood	892	10,474	6,526	67
Cooper	1,176	13,772	10,228	242
*El Dorado	4,671	241,361	38,639	1,588
Elrick[2]	452	699	4,301	51
Fairport	1,072	30,960	8,040	262
Fox Bush	405	22,085	4,915	136
Garfield	675	6,586	15,414	237
Gates	727	10,823	5,177	147
Genesco-Edwards	1,724	64,471	21,529	424
Gladys	1,253	7,612	23,388	234
Gorham	1,159	64,360	20,640	429
*Hall-Gurney	3,312	84,360	22,640	1,242
Holley	381	2,523	3,477	117
Interstate	1,068	2,352	12,648	77
Irvin	608	3,500	4,500	87
Iuka-Carmi	896	21,673	10,327	255
Jelinek	444	5,926	4,074	76
*Kraft-Prusa	2,743	86,875	33,125	677
Larned	463	3,727	4,273	66
Leiker, East	485	2,114	4,886	44
Lost Springs[1]	1,634	14,932	14,068	533
Madison	478	11,515	3,485	150
Marcotte	1,601	20,180	14,820	339
Morel	1,339	26,039	10,961	231
Mueller (Sittner)	371	8,619	4,381	99
Nichols[3]	740	2,315	8,685	70
North Hampton	383	4,809	4,191	55
Norton	603	4,614	5,386	116
Ogallah	644	5,016	4,984	79
Otis-Albert	464	12,955	3,045	193
Paden	395	4,739	5,261	90
Pleasant Prairie[4]	1,238	1,892	23,108	65
Ray	1,367	23,800	6,200	162
Rhodes	437	5,626	8,374	160
Ritz-Canton	1,160	50,716	15,284	399
Russell	609	18,050	2,950	190
Sallyards	798	16,103	8,897	190
Seely-Wick	584	27,446	7,554	235
Spivey-Grabs	2,205	9,477	20,523	387
Stoltenberg	736	42,022	7,978	281
Sugarloaf, Southeast	400	2,224	7,776	50
Teeter	509	18,375	6,625	170
Thrall-Agard	643	32,365	9,635	328
*Trapp	3,249	169,550	40,450	1,166
Trenton	480	884	4,116	59

Field—	1959 prod.	Cum. prod.	Est. reserve	No. wells
KANSAS (Continued)				
Trico	1,193	5,856	13,144	166
Unger	1,040	3,692	11,308	147
Welsh-Bornholdt	950	31,429	9,571	422
Wellington	594	10,407	3,593	139
Wichita	401	839	4,161	47
Wils[5]	382	489	3,511	52
Workman, Northwest	389	1,414	6,586	57
Zenith-Peace Creek	409	40,347	9,653	110
Eastern-Shallow Stripper	5,647	248,456	53,544	8,100

(1) Lost Springs, cons. Dec. 1958, includes Lost Springs, Lost Springs, North, Lost Springs, Northwest, Lost Springs, Southeast, Antelope, and Nelson. (2) Elrick, cons. Dec. 1958, includes Elrick, Elrick, Northeast, and Elrick, Northwest. (3) Nichols, cons. Dec. 1958, includes Nichols and Nichols, Southwest. (4) Pleasant Prairie, cons. April 1959, includes Pleasant Prairie, Pleasant Prairie, Northwest, and South Side. (5) Wils, cons. Sept. 1959, includes Wils, Wils, South, and I.H.M.

NEW MEXICO

SOUTHEAST NEW MEXICO

Allison	681	2,496	14,504	18
Anderson Ranch	1,132	6,748	10,252	25
Arrowhead	489	23,170	6,830	97
Artesia	946	12,590	11,410	416
Bagley	1,188	16,291	13,709	28
Bronco	848	4,644	15,356	18
Brunson	519	25,995	14,005	80
*Caprock & East	6,581	38,961	61,039	634
Caudill Devonian	544	4,702	15,298	15
Crossroads	1,426	11,711	23,289	24
Dean	733	5,169	19,831	30
*Denton	7,141	69,867	55,133	202
Dollarhide, West	1,855	19,371	20,629	176
Drinkard	1,597	48,003	26,997	460
Echols & East & North	565	4,662	5,338	13
Empire-Abo	797	903	19,097	40
Eumont	2,843	15,563	34,437	581
*Eunice	1,759	124,039	15,961	296
*Monument	4,744	157,941	42,059	517
Eunice, South	1,393	17,326	15,674	215
Fowler, all sands	711	6,789	8,211	21
Gladiola	7,046	26,301	33,699	108
Grayburg-Jackson	1,554	41,464	14,536	540
Hare	634	12,690	16,310	83
Henshaw, West	433	928	9,072	53
*Hobbs	3,399	163,424	32,576	326
Jalmat	2,167	41,648	48,352	404
Justis	2,209	3,020	26,980	96
Kemnitz-Wolfcamp	1,872	4,143	22,857	36
King	740	2,689	12,311	17
Knowles & South	684	5,745	9,255	21
Langlie-Mattix	2,289	42,743	17,257	802
Loco Hills	384	17,811	7,189	233
Lovington & E. & W.	2,337	32,285	22,715	241
Maljamar	2,730	40,320	29,680	384
Moore	1,014	7,944	12,056	20
Paddock	441	12,378	7,622	104
Pearl-Queen	620	978	9,022	59
Ranger Lake-Penn	468	866	9,134	9
Saunders & South	2,476	16,227	17,773	95
Skaggs	362	4,757	7,243	79
Square Lake	567	9,927	20,073	261
Terry-Blinebry	860	5,433	14,567	105
Townsend-Wolfcamp	1,253	12,645	37,355	104
*Vacuum	3,270	88,282	36,718	482
Vacuum, So.-Dev.	439	590	9,410	8
Warren	1,194	11,761	12,239	50

NORTHWEST NEW MEXICO

Bisti-Gallup	6,570	13,159	22,841	352
Gallegos-Gallup	274	761	8,239	90
Horseshoe-Gallup	3,538	4,025	15,975	284
Verde-Gallup	1,863	3,284	8,716	154

ROCKY MOUNTIAN STATES

COLORADO

Adena and South Adena	6,463	33,354	41,646	193
Big Beaver	1,014	5,122	14,878	21
Black Hollow	538	3,790	6,210	18
Bobcat	535	4,426	3,574	27
Cliff	557	3,570	3,430	30
Graylin and Northwest	524	7,055	5,945	51
Little Beaver Creek[1]	833	10,552	12,448	56
Little Beaver, East	868	4,538	12,462	51
McCallum, North	458	3,470	2,530	15
Mount Hope (East and North)	689	6,236	3,764	52
Nugget[1]	458	706	4,294	18
Pierce	770	2,508	3,492	19
Plum Bush Creek	790	5,042	4,958	21
*Rangely	17,980	282,879	133,121	460
West Fork	412	1,135	8,865	16
Wilson Creek	2,709	42,263	17,737	38
Yenter	509	6,955	6,045	27

(1) Nugget separated from Little Beaver Creek.

MONTANA

Bowes Dome	370	5,342	9,658	91
Cabin Creek	4,446	14,790	37,210	93
*Cut Bank	2,037	90,489	15,511	1,100
Elk Basin (see Wyoming)				
Glendive	522	4,328	5,672	12
Kevin-Sunburst	777	64,999	10,001	1,253
Outlook	695	1,286	8,714	14
Pennel	537	2,209	20,791	21
Pine Unit Area	4,852	21,012	38,988	138
Pondera	522	14,573	5,427	332
*Poplar, East	3,780	24,061	95,939	101
Stensvad	901	901	14,099	20
Sumatra and Northwest	1,978	9,050	25,950	80
Wolf Springs	510	2,070	7,930	18

NEBRASKA

Allchin	516	1,263	3,737	9
Barrett	885	885	9,115	24
Brinkerhoff	410	410	4,590	8
Cook	546	2,698	7,303	15
Enders	484	3,461	6,539	25
Griffin Cons.	465	1,498	5,502	23
Heidemann	396	1,546	5,454	22
Juelfs	402	2,059	7,941	29
Kenmac (Hackberry)[1]	404	1,351	6,649	22
Lewis	454	608	4,392	13
Ludden	368	655	4,345	10
Olsen	413	2,740	5,260	32
Potter, Southwest	663	3,699	6,301	42
Simpson[2]	507	558	4,442	22
Singleton	986	986	4,014	25
Sloss-Haffeman, South	1,978	7,413	17,587	76
Torgeson	378	2,471	3,529	34
Travis	463	3,326	3,674	22
Willson Ranch	1,005	1,700	3,300	28

(1) Hackberry (cons. with Kenmac). (2) Rounds (cons. with Simpson).

NORTH DAKOTA

Antelope Cons.	1,586	3,791	26,209	90
*Beaver Lodge-Tioga	7,048	53,770	[1]78,230	426
Blue Butte	1,953	5,183	30,817	144
Charlson Area	1,060	5,805	33,195	89
Newburg	1,114	1,754	13,246	96
Rival, South	717	717	9,283	33
Tioga, North	1,088	1,479	23,521	78

(1) Adjusted.

UTAH

*Aneth	10,200	20,298	161,702	190
Ashley Valley	799	9,582	5,418	26
Ismay (Aneth, East)	443	717	9,283	20
*McElmo Creek	9,191	12,138	87,862	97
Ratherford (Desert Creek, North)	7,571	11,267	63,738	117
*Red Wash	3,554	10,775	89,225	101
White Mesa	6,390	9,231	50,769	90

WYOMING

Ash Creek and South[1]	963	6,360	8,640	54
Beaver Creek	2,220	13,039	26,961	35
Big Muddy	1,669	43,109	11,891	146

Field—	1959 prod.	Cum. prod.	Est. reserve	No. wells
WYOMING (Continued)				
Big Piney and Chimney Butte	508	616	8,384	44
Big Sand Draw	2,351	30,866	24,134	23
Bonanza and East	3,268	31,099	38,901	51
Brooks Ranch	375	823	4,177	3
Byron	2,482	44,719	15,281	105
Circle Ridge	557	10,730	9,270	99
Clareton and South	838	16,408	8,592	323
Cole Creek and Northeast[2]	390	9,240	5,760	49
Cole Creek, South[2]	416	8,096	6,904	41
Cottonwood	2,750	13,742	33,258	44
Coyote Creek	514	514	4,486	2
Crooks Gap	521	9,187	8,813	8
Dead Horse Creek	785	1,693	8,307	21
Donkey Creek (and Rozet)[3]	1,852	4,000	15,000	20
Dugout Creek (and Sussex, West)[4]	882	9,606	10,394	110
*Elk Basin[1]	21,438	163,156	236,844	288
Elk Basin, South	577	7,337	7,663	25
Fiddlers Creek	724	12,092	7,908	26
Four Bear	1,744	2,116	17,884	5
Frannie[1]	2,806	48,942	17,058	111
Garland and South	5,325	54,350	35,650	165
Gebo	1,143	11,457	13,543	43
Glenrock and South	3,082	31,367	18,633	182
Golden Eagle	985	7,512	12,488	12
*Grass Creek	4,697	71,834	28,166	100
Grieve Unit	3,440	9,011	25,989	18
*Hamilton Dome	6,793	63,084	46,916	92
Happy Springs-Jade	713	6,751	8,249	27
LaBarge and North	518	15,833	4,167	140
*Lance Creek	896	99,097	20,903	287
Little Buffalo Basin	2,240	17,335	19,665	31
*Lost Soldier	3,775	78,633	31,367	75
Meadow Creek and East and North	2,459	21,084	24,916	183
Murphy Dome	2,909	12,942	22,058	19
Mush Creek	985	15,090	26,910	725
North Fork	1,670	4,389	15,611	5
*Oregon Basin and West	5,557	92,760	64,240	319
Pitchfork	634	4,027	3,973	9
Robinson Ranch	775	775	9,225	7
Rock River	682	32,667	7,333	35
Sage Creek and West	437	2,083	11,917	20
*Salt Creek	5,398	379,554	40,446	1,074
Salt Creek, East	1,408	5,327	14,673	10
*Steamboat Butte	3,188	43,852	57,148	46
Sussex[4]	3,085	20,922	36,078	103
Torchlight	729	3,575	6,425	14
Wertz	2,233	39,034	42,966	32
Winkleman Dome	3,132	19,375	30,625	25
Worland	390	14,533	8,467	30

(1) Includes Montana portion. (2) Cole Creek, South, removed from Cole Creek. (3) Rozet cons. with Donkey Creek. (4) Sussex, West, removed from Sussex and cons. with Dugout Creek.

TEXAS

Field—	1959 prod.	Cum. prod.	Est. reserve	No. wells
SOUTHWEST TEXAS				
RAILROAD DIST. 1:				
Big Foot	1,110	14,263	20,737	601
Charlotte	786	18,995	18,005	281
*Darst Creek	3,336	104,610	30,390	578
Fashing	712	712	49,288	52
*Luling-Branyon	2,715	114,319	22,681	906
RAILROAD DIST. 4:				
*Agua Dulce-Stratton	5,222	151,823	73,177	445
Borregos	2,632	22,032	27,968	199
Fulton Beach	1,738	23,228	31,772	243
Garcia	719	16,894	8,106	118
*Government Wells, North & South	1,363	80,907	19,093	497
Hagist Ranch	462	4,512	5,488	75
Hoffman	1,410	33,991	16,009	413
Kelsey	2,726	41,013	30,987	423
*La Gloria	3,199	73,301	76,699	177
Loma Novia	880	42,130	17,870	436
Mustang Island	1,490	19,725	20,275	139
*Plymouth	3,847	107,343	52,657	256
Portilla	1,353	31,208	58,792	121
Prado	434	1,315	8,685	64
Red Fish Bay	721	9,775	10,225	75
*Rincon & Vicksburg	1,183	41,665	28,335	174
Rincon, North	489	1,032	8,968	83
*Seeligson (all zones)	14,918	184,269	215,731	828
Seven Sisters	877	45,788	14,212	256
Sun & East & North	1,261	25,218	14,782	217
Taft (all fields)	1,041	25,121	12,878	137
Tijerina-Canales	2,244	40,492	44,508	237
*White Point, East	2,477	70,702	39,298	382
Willamar & West	1,508	42,846	32,154	263
TEXAS GULF COAST				
RAILROAD DIST. 2:				
Appling	419	3,542	16,458	34
Berclair	504	6,365	3,635	89
Bloomington	837	18,406	18,594	107
Bonnie View	419	11,391	9,609	72
Burnell & Tulsita	3,054	39,418	27,582	35
Cottonwood Creek & So.	439	5,812	6,188	50
Falls City	706	14,925	9,075	75
Francitos & North	983	11,512	28,488	59
*Greta	1,671	77,735	42,265	204
Helen Gohlke	879	16,085	13,915	107
Heyser	718	44,552	15,448	174
Lake Pasture	670	3,589	11,411	64
La Rosa	483	17,775	8,225	63
Lolita	1,646	32,924	17,076	282
Mary Ellen O'Connor	1,341	9,387	40,613	154
McFaddin	413	24,687	10,313	57
Placedo & East	932	36,970	8,030	177
*Refugio (all fields)	1,608	81,056	68,944	197
Roche	404	8,485	16,515	47
Swan Lake	463	6,745	12,255	38
*Tom O'Connor	6,460	245,753	204,247	684
*West Ranch	4,729	117,657	132,343	663
RAILROAD DIST. 3:				
Amelia	657	27,285	12,715	108
*Anahuac	4,066	149,985	116,015	319
Bammel	830	2,923	7,077	15
*Barber's Hill	1,514	109,603	20,397	151
Bay City	664	23,842	6,158	53
Bender	550	4,640	10,360	69
Boling & South	1,555	34,399	45,601	198
Cedar Point	427	12,892	12,108	33
Chenango	537	2,883	12,117	49
*Chocolate Bayou	3,867	67,925	39,075	115
Columbus	507	2,226	17,774	34
*Conroe	6,017	382,832	217,168	779
Danbury Dome	667	11,275	18,725	75
Fannett	1,010	32,367	17,633	79
Fig Ridge	851	21,188	18,812	69
Franks	648	2,620	8,380	31
*Gillock & Dickinson	3,125	51,378	48,622	223
*Goose Creek & East	2,633	105,177	44,823	317
Hampton, South	461	1,312	8,688	
Hankamer & South	945	17,263	22,737	111
*Hastings	9,290	303,630	196,370	627
*High Island	4,112	57,518	42,482	185
Houston, North	501	1,807	8,193	8
Houston, South	971	30,716	22,284	81
*Hull & Merchant	3,919	153,267	93,733	471
*Humble (all fields)	1,278	142,744	29,256	403
*Katy, North	9,232	124,277	75,723	103
*Liberty, South	3,548	47,059	92,941	379
Livingston	768	27,467	7,533	126
Lovell's Lake	557	23,678	11,322	69
*Magnet Withers & East & West	1,088	39,942	65,058	235
Manvel & Northwest	1,098	59,574	25,426	148
Markham-North Bay City	793	29,513	20,487	97
*Old Ocean	5,129	[1]98,251	98,749	158
Orange	1,316	45,404	19,596	239
Oyster Bayou	2,145	45,987	24,013	51
*Pierce Junction	3,818	80,290	119,710	274
Port Acres	1,555	2,183	23,817	22
Port Neches & North	420	8,654	16,346	40
*Raccoon Bend	1,362	63,548	36,452	212
Red Fish Reef (all fields)	1,568	13,354	26,646	99
Rose City	485	5,822	4,178	23

Field—	1959 prod.	Cum. prod.	Est. reserve	No. wells
TEXAS (Continued)				
Saratoga and West	1,345	47,796	22,204	414
Sheridan	2,010	27,807	34,193	20
Silsbee & West	1,310	31,086	18,914	52
*Sour Lake	1,302	101,491	23,509	309
*Spindletop	613	135,959	14,041	135
Stowell	1,173	47,760	22,240	76
Sugar Valley	618	18,028	11,972	101
Sugarland	615	54,896	10,104	47
*Thompson (all fields)	5,673	235,640	109,360	352
Tomball	1,230	61,455	20,545	330
Trinity Bay & West	936	5,193	14,807	54
Umbrella Point	574	1,129	13,871	27
Village Mills & East	2,081	26,544	23,456	173
*Webster	6,859	245,763	204,237	206
*West Columbia & New	3,032	131,325	28,675	222
Withers, North	1,062	35,017	24,983	129
EAST TEXAS				
RAILROAD DIST. 5:				
Corsicana	1,275	23,117	16,883	1,733
*Powell	272	126,952	3,048	103
*Van & Van Shallow	5,312	287,115	117,885	648
RAILROAD DIST. 6:				
Bethany (all fields)	1,136	2,921	12,079	154
Carthage	1,043	27,338	17,662	123
Chapel Hill	408	5,675	9,325	35
*East Texas	52,992	3,411,098	1,699,912	18,850
Good Omen	405	2,595	7,405	64
*Hawkins	9,845	251,701	273,299	590
Haynes	866	5,122	19,878	144
Kildare	1,400	6,940	18,060	127
Long Lake & East	631	29,771	10,229	113
*Neches	2,296	15,697	169,303	250
New Hope	2,752	31,664	21,336	74
Pewitt Ranch	666	11,048	18,952	113
Quitman	2,568	41,892	28,108	247
Rodessa		(See North Louisiana)		
Shamburger Lake	480	877	9,123	39
Slocum (all fields)	1,359	4,564	30,436	139
*Talco	4,284	170,436	59,564	631
Waskom	936	10,902	24,098	144
Wright Mountain	937	1,922	18,078	81
NORTH AND WEST CENTRAL TEXAS				
RAILROAD DIST. 7-B:				
Callahan County:				
Bok	388	2,911	9,089	59
Coleman County:				
Glen Cove (all fields)	486	5,994	9,006	86
Goldsboro	576	3,813	6,187	205
Fisher County:				
Claytonville	863	6,827	13,173	67
Eskota	500	4,262	5,738	100
Pardue	486	8,322	6,678	74
Round Top	1,052	18,050	11,950	188
Haskell County:				
Juliana	389	2,864	2,136	36
Sojourner	745	5,535	8,465	81
Nolan County:				
Dora, North	925	5,480	19,520	78
Hylton, Northwest	807	6,398	18,602	78
Lake Trammel, West	385	3,835	11,165	71
Nena Lucia	1,742	6,767	33,233	218
White Flat	673	6,510	13,490	65
Stonewall County:				
Boyd	874	7,390	27,610	67
Flowers Canyon	1,146	11,057	13,943	222
Katz	2,179	17,951	32,049	216
Old Glory	443	6,751	18,249	88
RAILROAD DIST. 9:				
Archer County:				
Hull-Silk-Sikes	1,135	54,145	25,855	414
Clay County:				
Joy	1,210	14,294	20,706	259
Cooke County:				
Gatewood	1,175	4,105	4,895	92
Sivells Bend	816	13,991	11,009	83
Walnut Bend	2,404	50,302	39,698	324

(1) Corrected.

Field—	1959 prod.	Cum. prod.	Est. reserve	No. wells
TEXAS (Continued)				
Foard County:				
Rasberry (6,100-ft. Caddo)	521	1,723	7,277	65
Grayson County:				
Big Mineral Creek	1,473	10,703	24,297	158
Sandusky	603	5,872	4,128	38
Sherman (all fields)	2,109	22,596	47,404	323
Knox County:				
Knox City, North	473	5,833	4,167	54
Voss	550	1,418	8,582	135
Wichita County:				
*Burkburnett	2,142	190,901	63,099	1,393
*Electra	2,144	184,611	32,389	2,786
*K.M.A.	3,862	120,638	64,362	1,627
Wilbarger County:				
Fargo	774	16,062	8,938	140
Wise County:				
Alvord	651	2,591	7,409	112
Caughlin	423	1,618	8,382	91
Chico, West	621	4,270	10,730	121
Young County:				
Boren	411	1,220	8,780	86
Langston-Kleiner	580	5,849	9,151	194
TEXAS PANHANDLE				
RAILROAD DIST. 10:				
*Badger	3,739	96,615	36,385	1,354
*Borger-Pantex	3,431	142,258	42,742	1,184
Farnsworth	1,260	3,448	11,552	71
*Finley	3,017	123,053	56,947	727
Horizon (Cleveland)	384	515	9,485	52
Quinduno	1,344	8,948	19,052	177
R. H. F.	488	791	9,209	38
Twin	906	2,089	12,911	84
Waka, West	755	1,930	13,070	42
*West Pampa	3,154	129,772	30,228	1,183
RAILROAD DIST. 7-C:				
Adamc	372	2,399	7,601	18
Amacher Tippelt	1,015	5,178	14,821	42
Benedum-Spraberry	1,566	26,864	33,136	201
*Big Lake (all fields)	631	117,135	4,865	153
Bronte	667	7,295	7,705	99
Fort Chadbourne	3,390	33,855	26,145	152
Huldale, Penn.	1,119	12,642	27,358	124
I. A. B.	1,015	1,552	18,448	72
*Jameson (allfields)	2,994	43,625	56,375	650
King Mountain	628	2,706	7,294	24
*McCamey	1,986	104,372	35,628	912
Neva, West	718	5,012	9,988	37
Olson	621	5,449	12,551	131
*Pegasus	3,998	44,430	92,570	322
Shannon	427	3,330	6,670	133
Spraberry Trend (See Dist. 8)				
Susan Peak	482	8,763	11,237	66
Todd Dup., Grayburg & San Andres	1,477	38,605	31,395	91
Wilshire	1,400	22,337	37,663	46
World	1,054	26,119	21,881	166
World, West	768	3,562	11,438	42
RAILROAD DIST. 8:				
Abell (all fields)	1,073	9,231	20,769	145
Adair	1,834	22,440	17,560	170
Amrow, Dev.	645	4,474	11,526	19
*Andector	3,427	61,552	48,448	141
Andrews	2,046	10,561	39,439	159
Andrews, South	2,070	5,072	24,928	109
Anton-Irish	1,909	28,793	19,207	191
Arthur Spraberry	1,251	4,456	16,544	98
Bakke (all fields)	3,050	6,575	43,425	152
Bedford	400	8,162	11,838	24
Block A-34	407	3,122	11,878	26
Block 9	795	1,260	10,740	31
Block 11 & S. W.	561	5,217	9,783	48
Block 12, East	693	4,032	10,968	31
*Block 31	5,809	54,266	65,734	91
Brahaney	1,263	5,537	24,463	208
Buckshot (4,950 ft.)	1,297	2,341	9,659	161
C-Bar	729	4,952	15,048	144
Cedar Lake	1,075	20,757	24,243	179
Clairemont	406	2,590	7,410	40
*Cogdell (all fields)	6,047	64,683	90,317	431
Cordona Lake	416	4,064	10,936	46

Field—	1959 prod.	Cum. prod.	Est. reserve	No. wells
WEST TEXAS (Continued)				
*Cowden, North	7,105	144,250	105,750	943
*Cowden, South (and Johnson and Foster)	6,981	172,252	127,748	1,361
Deep Rock	917	7,944	19,056	46
*Diamond-M	7,627	91,532	103,468	632
*Dollarhide	3,008	66,470	73,530	318
Dora Roberts	2,239	11,095	38,905	80
Dorward	689	5,069	9,931	214
Dune	4,547	16,408	53,592	670
Edwards	680	3,202	11,798	128
Embar (all fields)	1,659	23,243	16,757	195
*Emma (& Triple N.)	5,961	35,405	64,595	322
Emperor (all fields)	2,173	18,025	31,975	376
Fasken	708	2,169	7,831	45
Flanagan	881	6,212	13,788	107
Fluvanna	1,248	6,917	28,083	102
Ford (Delaware)	419	837	14,163	82
Fort Stockton	1,172	11,834	20,166	316
*Fuhrman-Mascho	4,226	36,870	63,130	716
*Fullerton (& North & South)	6,493	136,731	113,269	911
Garza	2,045	36,446	33,554	509
Geraldine (Ford)	1,206	1,726	18,274	202
Glasco (Devonian)	657	3,778	11,222	22
*Goldsmith	20,164	275,829	174,171	3,089
Good	823	13,766	11,234	48
Good, Southeast	379	434	9,566	22
Grice (Delaware)	450	756	9,244	54
Hallanan	420	2,760	12,240	33
Halley	973	6,348	18,652	140
Harper	2,075	22,494	31,506	493
Harris	646	4,493	10,507	83
*Headlee	3,469	20,220	79,780	131
*Hendreck	2,283	232,519	39,481	359
*Howard Glasscock	6,499	206,248	80,752	1,631
Huntley	593	3,777	11,223	80
Hutex	1,202	4,876	25,124	41
Iatan—East Howard	1,847	36,821	23,179	682
Jo-Mill	3,784	15,586	60,414	218
*Jordan	3,024	57,981	42,019	393
*Kelly-Snyder	20,056	241,507	504,493	1,442
*Kermit	5,271	64,862	55,138	969
Kermit, South	570	910	8,090	43
*Keystone	5,963	164,547	138,453	908
Lea	928	6,980	18,020	76
*Levelland	6,346	113,083	136,917	2,025
Littlefield	397	2,191	7,809	64
Luther, S. E. (Dev.)	792	4,998	10,002	38
Mabee	1,697	16,670	28,330	197
Magutex	2,501	14,220	35,780	129
Martin	1,466	28,776	31,224	166
*McElroy	9,810	177,482	172,528	1,621
McFarland	2,011	10,844	49,156	322
*Means	3,961	51,171	78,829	597
Means, North Queen	507	2,160	9,840	63
*Midland Farms	4,765	59,016	50,984	356
Midland Farms, N. Gray	491	3,140	11,860	42

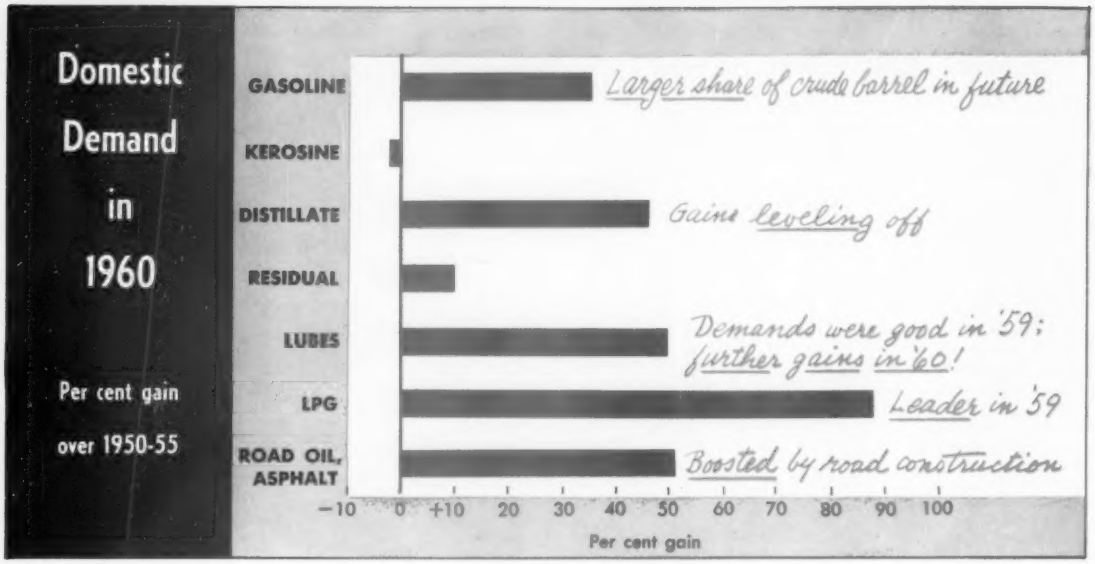
Field—	1959 prod.	Cum. prod.	Est. reserve	No. wells
WEST TEXAS (Continued)				
Midland Farms, N. E. Ellen	573	4,497	10,503	15
Monahans, North	1,199	3,532	26,468	54
Moore	609	5,038	4,962	244
Nolley	778	6,522	13,478	79
Oceanic (Penn.)	720	6,104	13,896	47
Pecos Valley (all fields)	2,016	15,141	19,859	1,201
*Penwell	2,761	44,490	55,510	421
Post, Glorieta	410	1,216	8,784	194
*Prentice	4,377	33,526	66,474	426
Reinecke	1,030	18,099	18,901	71
Revilo, Glorieta	1,130	3,770	31,230	283
Riley, North	710	7,495	7,505	80
Robertson	2,397	12,061	32,939	296
Robertson, North	817	2,158	15,842	78
Ropes	511	4,861	10,139	29
Running W.	1,447	5,461	22,539	132
*Russel and North	5,422	41,095	89,905	323
S-M-S	512	4,721	10,279	78
Salt Creek	3,879	30,624	49,376	110
*Sand Hills	5,189	78,648	51,352	867
Scarborough	2,215	12,245	42,755	241
*Seminole	2,972	99,010	80,990	353
Seminole, West	810	10,228	9,772	85
Shafter Lake	2,576	35,162	59,838	517
Sharon Ridge	2,384	22,039	56,961	1,532
Shipley	1,999	13,437	16,563	288
*Slaughter	9,062	260,437	179,563	2,527
Snyder	1,234	10,195	29,805	424
Spraberry and Deep	701	6,632	13,368	72
*Spraberry Trend	12,086	130,301	119,699	2,463
Spraberry West	771	3,912	11,088	54
*TXL	6,759	148,553	126,447	600
Three Bar (Dev.)	765	14,308	12,692	60
Twofreds	686	1,489	8,511	77
Union	1,025	7,031	12,969	120
University, Block 9	2,876	13,674	51,326	148
University, Waddell	1,245	10,465	24,535	87
Varel, San Andres	460	2,599	12,401	118
Vealmoor	894	15,493	49,507	79
Vealmoor, East	1,130	17,855	47,145	86
Virey	1,590	10,499	44,501	67
Waddell	2,376	28,069	51,931	362
War-San	1,094	5,958	24,042	37
*Ward, South	3,453	74,479	50,521	1,090
*Ward-Estes, North	14,616	99,530	43,470	1,800
*Wasson (66 & 72)	12,692	342,919	307,081	2,014
Welch	2,284	30,158	29,842	391
Wellman	706	10,387	9,613	30
Wemac	52[illegible]	3,780	8,220	19
Westbrook	1,657	23,822	35,178	449
Wheeler	691	24,533	25,467	65
Yarbrough and Allen	1,311	20,162	19,838	77
*Yates	6,372	462,293	187,707	669

*Sprayberry cum. taken from Dist. 7-C for 1959.

How "giant" fields compare with all fields (crude oil)

(Millions of barrels)

State—	Number giants	1959 production: All fields	1959 production: Giant fields	1959 production: Giants per cent	Estimated ultimate: All fields	Estimated ultimate: Giant fields	Estimated ultimate: Giants per cent	Remaining ultimate: All fields	Remaining ultimate: Giant fields	Remaining ultimate: Giants per cent
Texas	84	942.03	473.18	50.2	37,092	23,442	63.2	14,221	9,301	65.4
California	41	307.44	233.80	76.0	16,117	13,560	84.1	4,395	3,421	77.8
Louisiana	32	327.46	155.32	47.4	10,584	4,829	45.6	5,507	2,290	41.6
Oklahoma	21	194.73	82.22	42.2	10,236	5,263	51.4	2,204	924	41.9
Kansas	6	120.30	22.65	18.8	4,208	1,327	31.5	1,011	357	35.3
Wyoming	8	125.86	51.74	41.4	3,263	1,518	46.5	1,478	526	35.6
Illinois	7	78.09	42.98	55.0	2,833	1,710	60.4	679	368	54.2
New Mexico	6	104.34	26.89	25.8	2,464	886	40.0	1,057	243	23.0
Arkansas	3	26.74	10.75	40.2	1,431	785	54.9	372	132	35.5
Mississippi	4	46.14	13.29	28.8	1,132	500	44.2	503	182	36.2
Montana	2	29.95	5.82	19.4	774	226	29.2	438	111	25.4
N. Y.-Pa.	2	8.04	6.17	76.7	1,582	842	44.7	172	81	47.0
Utah	3	39.73	22.94	57.8	590	382	64.8	508	339	66.7
Colorado	1	47.00	17.98	38.3	949	416	43.8	401	133	33.2
North Dakota	1	17.91	7.05	39.4	466	132	28.3	384	78	20.4
Other states	0	86.43	0	0	3,120	0	0	718	0	0
Total U. S.	**221**	**2,502.19**	**1,172.78**	**46.9**	**96,841**	**55,818**	**57.6**	**34,048**	**18,486**	**54.3**



Look for 4.6% gain in total demand

Domestic crude production will rise 4.7% to meet increase

THIS SHOULD be a good year for both refiners and producers. Total demand will be up about 4.6%, and the gain for domestic crude production will be equally high.

Unless refiners and producers try to crowd too much of the year's total into one quarter, crude prices should be in line with posting for 1959. Product prices probably will be higher because price wars and distress selling were rampant last year. Increased volumes and better prices will bring a more profitable oil year.

Petroleum product demand was excellent in 1959 despite the slowdown in the general economy during the prolonged steel strike in the last part of the year. The upward trend is expected to continue through 1960.

Based on normal weather during the winter months, domestic demand for petroleum products this year will rise to 9,872,000 bbl. daily compared with 9,421,000 bbl. daily in 1959. And the total for 1959 represented a gain of 3.7% over the average for 1958.

On the supply side, total imports will increase about 2.7% in 1960 through adjustments in allocations and increased receipts from Canada. Crude imports will gain about 1.9% and products 3.6%.

Domestic crude production will rise about 4.7% to meet the forecast increases in demand. This rate allows for a small addition to crude stocks of 15,000 bbl. daily or a total for the year of 5,500,000 bbl. This addition will not be needed to meet demand but will come as a natural expansion in crude storage with the increase in production.

The gain in production of natural-gas liquids is forecast at 4.0% or slightly less than the crude gain. One reason for the smaller gain is the large expansion in 1959. Total plant production gained 8.3% last year.

Supply and demand totals by quarters are shown in the large table. Demand items are in the upper half and supply in the lower half. End-of-period stocks are at the bottom.

The smallest quarterly increase in demand for 1960 will be in the first period. The below-normal gain will be due not to a drop in sales this year but to some unusual reporting that gave an apparent increase in demand in the early part of 1959.

Product imports were very high in the first quarter last year. The average was 1,260,000 bbl. daily. Residual fuel accounted for 74% of the total for the quarter, and almost all of it entered on the East Coast. There is a good chance that a large portion of this fuel was discharged directly into storage tanks controlled by companies not reporting to the Bureau of Mines. Since the material was imported but was not counted in total stocks, it became a part of indicated demand.

Because of this inflated demand last year, the calculated gain for the first quarter of 1960 will be only about 2.4% over 1959. Demand for residual fuel will be less than last year's inflated total.

The chart shows important product demands for 1960 compared with averages for the 1950-55 period.

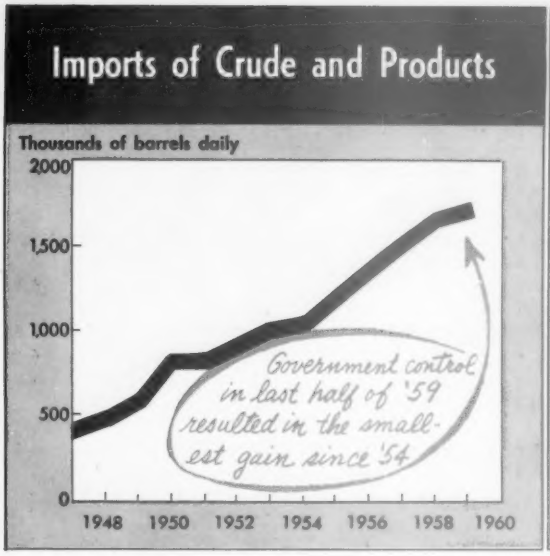
Forecast demand for the year assumes average temperatures.

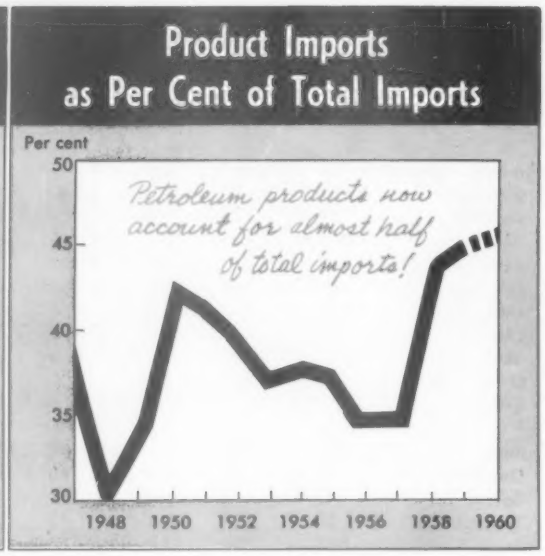
Journal forecast of supply and demand by quarters

(Thousands of barrels daily)

	Year 1959	1st quarter Vol.	1st quarter Per cent change	2nd quarter Vol.	2nd quarter Per cent change	3rd quarter Vol.	3rd quarter Per cent change	4th quarter Vol.	4th quarter Per cent change	Year 1960 Vol.	Year 1960 Per cent change
Domestic demand	9,421	**10,635**	**2.4**	**9,178**	**4.8**	**9,224**	**5.0**	**10,455**	**7.1**	**9,872**	**4.8**
Gasoline	4,057	3,850	3.9	4,440	4.8	4,500	3.4	4,155	5.8	4,237	4.4
Kerosine	305	470	1.3	180	12.5	210	5.5	405	2.3	316	3.6
Distillate	1,810	2,635	0.2	1,405	5.2	1,250	6.2	2,335	10.7	1,906	5.3
Residual	1,519	1,970	−1.3	1,380	1.8	1,280	8.4	1,710	10.2	1,585	4.3
Jet fuel	290	280	10.2	280	6.1	340	6.9	340	4.6	310	6.9
Lubricants	120	120	7.1	128	3.2	124	4.2	128	2.4	125	4.2
LP-gas	562	687	8.2	510	7.4	555	6.9	670	8.1	605	7.7
Asphalt & rd. oil	302	158	11.3	360	6.8	505	7.0	265	3.9	322	6.6
Other products	444	450	2.7	480	3.9	445	0.9	435	....	452	1.8
Crude loss	12	15	7.1	15	50.0	15	50.0	12	−14.3	14	16.7
Exports	242	**226**	**−9.2**	**242**	**−5.8**	**226**	**−1.7**	**227**	**−3.0**	**231**	**−4.5**
Gasoline	56	48	−4.0	60	−10.4	50	−14.0	50	−2.0	52	−7.1
Kerosine	2	2	....	2	....	3	....	5	150.0	3	50.0
Distillate	37	38	−2.6	35	−2.8	40	5.3	35	....	37	....
Residual	76	70	−23.9	70	−9.1	60	−1.6	65	−11.0	66	−13.2
Jet fuel	1	1	....	1	....	1	....	1	....	1	....
Lubricants	38	37	2.8	42	....	39	5.4	37	−2.6	39	2.6
LP-gas	6	7	16.7	6	....	7	11.7	7	....	7	16.7
Asphalt & rd. oil	3	2	....	3	....	5	66.7	3	....	3	....
Other products	16	15	7.1	15	−6.3	15	−16.7	18	....	16	....
Crude	7	6	−14.3	8	....	6	....	6	....	7	....
Total demand	9,663	**10,861**	**2.1**	**9,420**	**4.5**	**9,450**	**4.8**	**10,682**	**6.9**	**10,103**	**4.6**
Gasoline	4,113	3,898	3.8	4,500	4.5	4,550	3.2	4,205	5.7	4,289	4.3
Kerosine	307	472	1.3	182	12.3	213	5.4	410	3.0	319	3.9
Distillate	1,847	2,673	0.2	1,440	5.0	1,290	6.2	2,370	10.5	1,943	5.2
Residual	1,595	2,040	−2.3	1,450	1.3	1,340	7.9	1,775	9.2	1,651	3.5
Jet fuel	291	281	10.2	281	6.4	341	6.9	341	4.6	311	6.9
Lubricants	158	157	6.1	170	2.4	163	4.5	165	1.2	164	3.8
LP-gas	568	694	8.3	516	7.3	562	7.0	677	8.0	612	7.7
Asphalt & rd. oil	305	160	11.1	363	6.8	510	7.4	268	3.9	325	6.6
Other products	460	465	2.9	495	3.6	460	0.2	453	....	468	1.7
Crude	19	21	....	23	27.8	21	31.3	18	−10.0	21	10.5
Stock change	19	**−526**	....	**370**	....	**503**	....	**−381**	....	**−8**	....
Crude	−28	....	....	40	....	30	....	−10	....	15	....
Products	47	−526	....	330	....	473	....	−371	....	−23	....
New supply	9,682	**10,335**	**0.4**	**9,790**	**1.5**	**9,953**	**8.2**	**10,301**	**7.3**	**10,095**	**4.3**
Imports	1,761	**1,961**	**−11.6**	**1,707**	**6.8**	**1,705**	**11.1**	**1,859**	**9.2**	**1,808**	**2.7**
Crude	960	991	3.4	967	0.5	956	1.2	998	2.5	978	1.9
Products	801	970	−23.0	740	16.4	749	27.2	861	18.3	830	3.6
Production	7,921	**8,374**	**3.6**	**8,083**	**0.4**	**8,248**	**7.7**	**8,442**	**6.9**	**8,287**	**4.6**
Crude	7,045	7,439	3.3	7,203	0.2	7,376	8.4	7,485	7.0	7,376	4.7
Natural, etc.	876	935	6.4	880	1.7	872	1.9	957	6.0	911	4.0
Runs to stills	7,989	**8,383**	**2.4**	**8,083**	**2.1**	**8,257**	**3.9**	**8,449**	**6.9**	**8,293**	**3.8**
Crude transfers	25	**26**	**−27.8**	**24**	**14.3**	**24**	**41.1**	**26**	**23.8**	**25**	**13.6**
Total stocks*	796.5	**748.6**	....	**782.3**	....	**828.6**	....	**793.6**	....	**793.6**	....
Gasoline	189.0	216.0	....	185.0	....	170.5	....	182.5	....	182.5	....
Kerosine	26.8	18.0	....	27.0	....	33.0	....	27.0	....	27.0	....
Distillate	148.8	87.8	....	125.1	....	173.3	....	141.0	....	141.0	....
Residual	49.9	49.0	....	53.0	....	58.0	....	55.0	....	55.0	....
Other products	129.5	125.3	....	136.0	....	134.8	....	130.0	....	130.0	....
Crude	252.5	252.5	....	256.2	....	259.0	....	258.1	....	258.1	....

*Stocks in millions of barrels at end of period.





Imports will hit new high in '60

IMPORTS of crude and products into the U. S. will increase again slightly in 1960 after leveling off some last year when mandatory controls were applied.

Total imports for the year are forecast at 1,808,000 bbl. daily, a record high, but only 47,000 bbl. daily more than the 1959 average.

The predicted imports break down like this: 978,000 bbl. daily of crude and 830,000 bbl. daily of products.

The crude movement will be only 18,000 bbl. daily more than the 960,000 bbl. daily estimated average for 1959.

The products imports will be 29,000 bbl. daily more than the 801,000 bbl. daily estimated brought in last year.

The explanation. Why should imports rise in the face of mandatory controls to keep them down?

Crude imports will be under two pressures that probably will increase their volume.

Several importers already have filed for upward adjustments in their quotas. Others probably will do so. The expectation is that some adjustments will be granted. Also the volume of oil moving in from Canada outside the quota system is expected to increase. Neither trend, however, is expected to result in oil movements so heavy they will threaten the import-control system.

Marketing men feel certain that the imports of residual fuel will increase sharply over the first half of the year and perhaps continue high through the 12 months. This will boost the average for products imports materially.

Quotas. The quotas already assigned importing companies and refiners for 1960 allowed for increases.

Quotas for crude and unfinished oils for firms in Districts 1-4 will average 718,087 bbl. daily during the first half compared with old quotas averaging 681,820 (OGJ, Dec. 21, p. 54). In District 5 the new quotas totaled 220,095, a reduction from 232,920 bbl. daily set up in former quotas.

The new quotas for residual in Districts 1-4 averaged 425,000 bbl. daily compared with 364,995 bbl. daily set up for the previous 6 months. Quotas for importing other finished products remained unchanged for the first half.

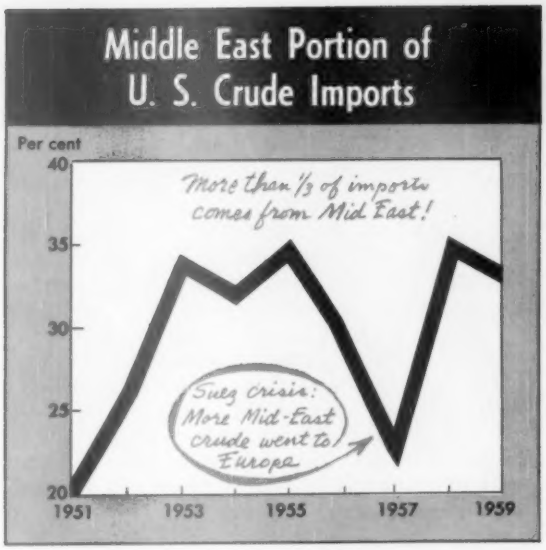
Inland refiners, unable to handle the imported crude in their plants, have set up a brisk trade in swapping their quotas for domestic crude. They are receiving a bonus ranging from 60 cents to $1.25 a barrel in the deals. The average is about 90 cents.

The import control system is under criticism from the importers who object to the subsidy realized by inland refiners, from the coal industry for the increased quotas for residual, and from domestic producers for the larger crude quotas. The system, however, is being accepted generally by the industry as the best compromise available at the time.

The 1959 story. Although imports continued to rise in 1959, the rate of increase leveled off.

Total imports averaged about 55,000 bbl. daily more than the 1958 average of 1,700,000 bbl. daily. The 1958 increase had been 125,000 bbl. daily. Previous increases had been 139,000 bbl. daily in 1957; 188,000 in 1956; and 196,000 in 1955.

Crude imports during 1959 actually were rather steady, ranging from a low of 907,000 bbl. daily in



the second quarter to a high of 974,000 bbl. daily in the last half.

Products, however, fluctuated wildly from a peak of 1,259,000 bbl. daily in the first quarter to a low of 589,000 bbl. daily in the third quarter. If it weren't for the first-quarter performance of products imports, the total average of imports would have been much closer to 1958 figures.

The percentage of products among the petroleum imports continued to grow in 1959. During the year products represented 45.3% of all imports compared with 43.9% the year before. They are expected to represent 45.9% of all imports in 1960.

Import-export record

(Thousands of barrels daily)

	Imports			Exports		
	Crude	Products	Total	Crude	Products	Total
1942	34	64	98	93	227	320
1943	38	136	174	113	298	411
1944	122	130	252	93	474	567
1945	203	108	311	90	411	501
1946	236	141	377	116	303	419
1947	267	170	437	127	324	451
1948	353	161	514	109	259	368
1949	421	224	645	91	236	327
1950	487	363	850	95	210	305
1951	490	354	844	78	344	422
1952	573	379	952	73	359	432
1953	648	386	1,034	55	347	402
1954	656	396	1,052	37	318	355
1955	782	466	1,248	32	336	368
1956	934	502	1,436	78	352	430
1957	1,023	552	1,575	138	430	568
1958	953	747	1,700	12	264	276
1959:						
1st qr.	958	1,259	2,217	7	241	248
2nd qr.	962	636	1,598	7	249	256
3rd qr.	945	589	1,534	6	224	230
4th qr.*	974	728	1,702	7	226	233
Year	960	801	1,761	7	235	242
1960†	978	830	1,808	6	224	230

*Estimated. †Forecast.

Where imports came from

FIRST 10 MONTHS

(Thousands of barrels daily)

	1959	1958	Change Volume	Change Per cent
Mexico	0.4	1.8	− 1.4	− 77.8
Colombia	33.3	24.1	9.2	38.2
Venezuela	444.1	431.3	12.8	3.0
Peru	....	0.6	− 0.6	−100.0
Ecuador	....	....	....	....
Trinidad	....	0.4	− 0.4	−100.0
Kuwait	166.3	178.3	−12.0	− 6.7
Saudi Arabia	64.3	71.1	− 6.8	− 9.6
Neutral Zone	40.7	35.9	4.8	13.4
Iraq	23.0	24.8	− 1.8	− 7.3
Iran	25.9	15.2	10.7	70.4
Qatar	0.8	4.3	− 3.5	− 81.4
Canada	90.5	86.1	4.4	5.1
Sumatra	54.0	56.1	− 2.1	− 3.7
Borneo	12.3	8.4	3.9	46.4
Brazil	1.8	0.9	0.9	100.0
Total	**957.4**	**939.3**	**18.1**	**1.9**

*Bureau of Mines.

Source of imports. Venezuela easily maintained its role as the major exporter of crude to the U. S.

Imports from Venezuela during 1959 averaged 444,100 bbl. daily, a 3% increase over 431,300 bbl. daily imported the year before.

Kuwait kept second place but like most other Middle Eastern countries its volume of exports to the U. S. dropped sharply. Kuwait shipments averaged 166,300 bbl. daily in 1959 compared with 178,300 bbl. daily the year before. That's a 6.7% drop.

The Middle East as a whole was the source of 33.53% of U. S. crude imports, a drop from 1958 when that region sent in 35.35% of U. S. imports.

Only Iran and the Neutral Zone increased their exports to the U. S. last year. The Neutral Zone showed a 13.4% gain by shipping 40,700 bbl. daily compared with 35,900 the year before. Iran posted a 70.4% gain, shipping 25,900 bbl. daily compared with 15,200 bbl. daily in 1958.

Canada, the third major foreign supplier, sent 5.1% more oil into the U. S. during the year. Canadian shipments averaged 90,500 bbl. daily. They were 86,100 bbl. daily in 1958.

Export picture. The American petroleum industry's role as an exporter continued to decline. A similar outlook is in store for 1960.

Exports for 1959 averaged 242,000 bbl. daily, nearly half what they were in pre-Suez days.

The outlook is for an average of 230,000 bbl. daily in 1960. The breakdown is 6,000 bbl. daily of crude and 224,000 bbl. daily of products. In 1959 exports averaged 7,000 bbl. daily of crude and 235,000 of products.

World output up million barrels daily

FEW FREE-WORLD countries made spectacular crude-production gains last year, but the increases added up to 1 million barrels daily and an all-time-high record.

The industry swallowed a world-wide price reduction early in the year, and neither the U. S. nor Venezuela set a new production mark. But a domestic gain of over 300,000 bbl. daily was on a par with the increase in the Middle East, and Venezuela's gain of 160,000 bbl. daily was second only to that of the U. S.

Despite the U. S. increase, there was no change in the long-range trend toward faster growth abroad. Foreign fields added 2 bbl. of production for each barrel increase in the U. S., and foreign output has taken a lead of approximately 2,500,000 bbl. daily.

The Middle East region passed the 4,500,000-bbl.-daily mark. Iran, Iraq, and Saudi Arabia enjoyed substantial gains, and set new all-time-high records. Kuwait remained at the same high level as the preceding year, and may have passed it slightly.

Russia is edging out Venezuela as the world's second-ranking oil country. Venezuela has more capacity, but seems unlikely to hit the 2,880,000-bbl. daily on Russia's timetable for 1960.

A sharp rise in African production still is a drop in the bucket in the over-all picture. But this should start changing this year as sizable crude shipments start moving through pipelines from the French Sahara.

Middle East passes 4,500,000 bbl. daily

Country—	Production (thou. bbl. daily) 1959	Per cent change	Est. crude oil reserves (mill. of bbl.)	Ref. capac. thou. of BPSD
Western Hemisphere				
Argentina	130.1	27.0	2,000.0	238.4
Bolivia	8.7	— 8.4	94.0	12.2
Brazil	66.3	28.8	250.0	156.3
Canada	508.3	12.0	4,590.0	920.0
Chile	17.7	17.2	65.0	24.0
Colombia	145.0	12.6	750.0	51.2
Cuba	0.5	—44.5	2.6	86.9
Ecuador	7.7	—10.5	24.0	7.4
Mexico	264.0	2.3	2,500.0	357.0
N.W.I.				680.0
Peru	48.4	— 6.9	325.0	49.2
Puerto Rico				83.7
Trinidad	112.0	9.3	425.0	182.0
Uruguay				28.0
Venezuela	2,768.0	6.3	18,000.0	886.0
Total	**4,076.7**	**+ 7.9**	**29,025.6**	**3,762.3**
Middle East				
Turkey			70.0	6.9
Aden				120.0
Bahrain	45.2	11.0	225.0	186.5
Iran	920.0	12.0	35,000.0	495.0
Iraq	845.0	16.2	25,000.0	55.8
Israel	2.0	25.0	40.0	87.0
Kuwait	1,410.0	0.06	62,000.0	220.0
Lebanon				24.0
Neutral Zone	116.0	40.7	6,500.0	50.0
Qatar	174.4		2,500.0	0.6
Saudi Arabia	1,084.0	6.4	50,000.0	189.0
Southern Arabia			100.0	
Syria			1.0	
Total	**4,596.6**	**+ 8.2**	**181,436.0**	**1,434.8**
Africa				
Algeria (incl. Sahara)	21.5	129.0	5,000.0	
Angola	0.9		25.0	2.2
Egypt	58.0	— 4.0	500.0	87.2
Gabon	14.5	57.7	150.0	
Libya			1,500.0	
Morocco	1.9	26.7	8.5	2.1
Moyen Congo			10.0	
Nigeria	11.0	93.0	80.0	
South Africa				25.0
Total	**107.8**	**+21.8**	**7,273.5**	**116.5**
Europe				
Austria	45.5	—14.8	250.0	46.5
Belgium				170.7
Denmark				0.5
Finland				25.0
France	29.9	9.1	200.0	769.2
West Germany	98.6	14.1	500.0	572.7
Greece				30.0
Italy (incl. Sicily)	30.0	4.9	300.0	773.0
Ireland				40.0
Netherlands	33.6	8.8	200.0	359.0
Norway				2.0
Portugal				22.9
Spain				145.5
Sweden				47.8
U.K.	1.7		6.0	962.6
Yugoslavia	11.0	24.6	40.0	10.1
Total	**250.3**	**+ 3.3**	**1,496.0**	**3,977.5**
Asia-Pacific				
Australia			1.0	237.0
British Borneo	112.0	4.2	500.0	46.0
Burma	10.4	18.2	45.0	9.4
Formosa	0.04		.5	28.0
India	9.0	5.9	525.0	112.3
Indonesia	338.0	4.0	9,000.0	273.8
Japan	7.4	4.2	50.0	640.1
New Guinea	4.4	—13.7	28.0	
Pakistan	5.9		25.0	6.0
Philippines			1.0	22.0
Total	**487.14**	**+ 5.6**	**10,175.5**	**1,374.6**
Total non-Communist countries less U.S.	**9,518.5**	**+ 8.0**	**229,406.6**	**10,665.7**
United States	**7,045.0**	**+ 5.0**	**34,048.6**	**10,250.0**
Total free world	**16,563.5**	**+ 6.7**	**263,455.2**	**20,915.7**
USSR and Red Bloc areas	**2,895.0**	**+14.5**	**30,137.0**	
Total world	**19,458.5**	**+ 7.9**	**293,592.2**	

Growing free-world demand will take a bite out of the industry's excess crude producing capacity this year.

Industry economists look for an increase in consumption close to 1 million barrels daily. The increase will be the result of a gain of about 4.8% in the U. S. and 6.2% in foreign areas. This will add up to an over-all free-world gain of about 5.4%.

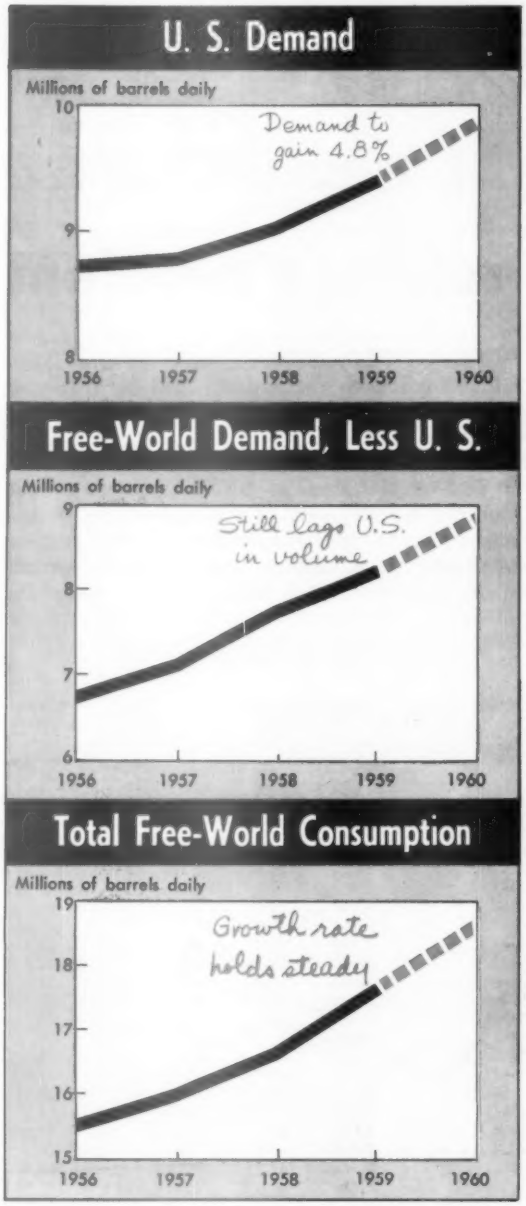
No startling new changes in the world's economy will be needed to account for an increase on this scale. World demand grew about 1 million barrels daily last year. In the past 3 years, consumption increased 2,200,000 bbl. daily despite two setbacks in the world's economy. These were the Suez crisis that knocked a hole in European consumption, and the business recession in the U. S.

The hope for gains on a percentage basis is not as high as in the early 1950's. But the industry still can look forward to the big increases in volume that prompted companies to invest hundreds of millions in foreign exploration in recent years.

The fly in the ointment, of course, is that with no way to tell when, or how much, if any, oil will be found, too many new fields were uncovered by too many firms a little too soon.

The pattern of foreign versus domestic demand resembles the crude-producing situation of a few years ago. U. S. consumption is growing. But foreign demand, while still below the U. S. level, is growing at a faster clip.

Four years ago foreign consumption trailed domestic about 2 million barrels daily. This year it will lag by 1 million barrels daily. Two or three years hence it will surge ahead.



Foreign growth . . . Western Europe will take more of the new supplies than any other area.

The seven biggest consumers, United Kingdom, West Germany, France, Italy, Sweden, Netherlands, and Belgium, are expected to have an over-all gain matching last year's increase of about 12.4% Inland demand in these countries rose to 2,400,000 bbl. daily, paced by a 15.2% rise in fuel-oil sales.

United Kingdom consumption alone rose 15.5% last year to nearly 700,000 bbl. daily. German demand was up 21% to about 465,000 bbl. daily. Fuel-oil sales in the two countries rose 26.7 and 30%.

But no single country can illustrate the foreign area as a whole. On one extreme, countries such as Pakistan have a per capita consumption of 4 or 5 gal. per year.

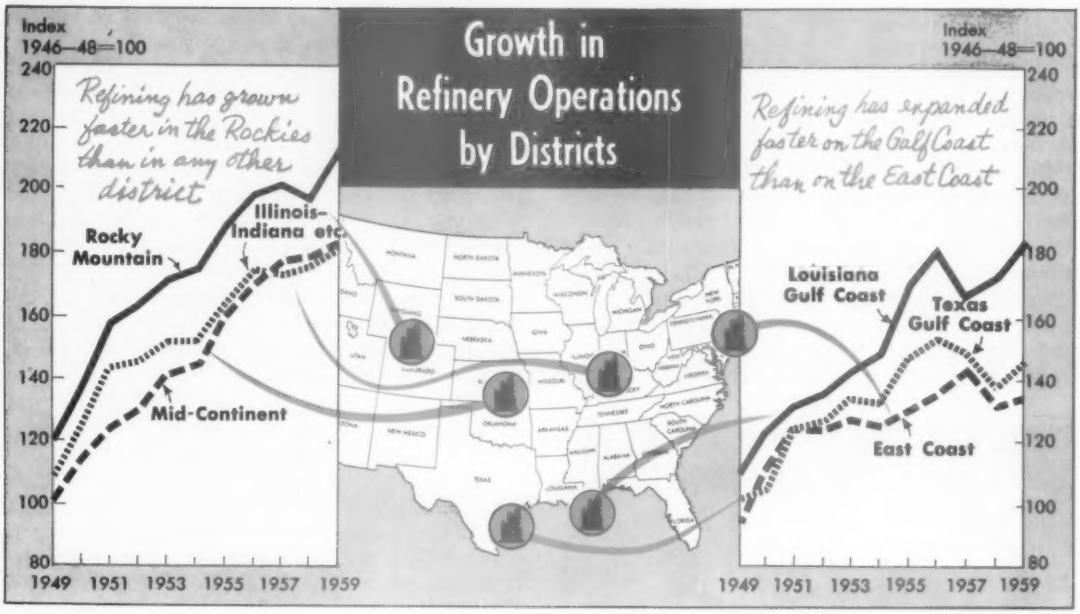
On the other end of the scale, Sweden, with the highest per capita consumption in Europe, can look for an increase in demand at about the same rate as the U. S. Half of Swedish energy needs already are supplied by oil, and the conversion to heating and fuel oil virtually is completed. Gasoline is enjoying the fastest rate of growth, with an 8.6% gain last year. Unlike the rest of Europe, fuel-oil sales were up less than 2%.

New supplies . . . Oil from the French Sahara will come into its own as a major new source of crude this year. A 24-in. pipeline from Hassi Messaoud field is already moving crude to the Mediterranean, and a 24-in. system from the Edjele area will open later this year.

The volume of crude actually moving through the pipelines may not be large this year. But questions now being threshed out in Paris in one way or another will probably leave a permanent mark on the European industry.

Vital issues now being resolved cover the amount of Saharan crude French refiners will be forced to take, and the role the French Government will play in domestic marketing. None of the government-controlled companies have marketing facilities, but the government definitely intends to acquire some sort of interest.

France also is pushing for preferential treatment for Saharan oil in the six-country Common Market.



Overcapacity still a refiner's problem

REFINERS ran too much crude to stills in 1959. As a result, they had a soft market to contend with most of the year. Two processing sprees did the damage. During March, runs normally decline as the heating season ends. In March 1959 they rose and gasoline was under price pressure for the rest of the year.

Again in August, at the close of the heavy motoring season, runs bucked the trend and moved upward. That shaved refiners' realizations for several months to come.

A contributing factor in this state of affairs is today's burdensome excess of processing capacity.

Had refiners kept their runs geared to demand, 1959 would have marked a new postwar low in operating level with respect to capacity. Runs averaged 84.1% of total operable capacity last year, just slightly above the 83.8% postwar low of 1958.

Some relief to the problem of overcapacity is in sight, but a full solution is not yet assured. Partial returns from the Journal's annual refining survey indicate that total capacity as of January 1 will show a gain of only 0.5% over a year ago.

Moreover, new construction projects now under way or announced for crude capacity are so few as to be negligible. Practically all refinery construction under way today is for downstream units, designed to upgrade quality. An increase in crude capacity during 1960 of less than 1% is predicted.

Demand promises a 4½% gain this coming year. But refiners should hold runs to less than a 4% increase if they are to regain a desirable inventory level.

Two big "ifs" now loom important for 1960. If runs are held to a reasonable level and if further new additions to crude capacity are held in check, the year will see an improvement in refinery operating levels to about 86.8%.

This combination of ideal conditions would bring the industry part of the way out of its dilemma. But it will take at least another year of sustained gains in demand, and rigid self-discipline on the part of refiners, before refinery operations

Refinery-yield trends

	Runs (thou. bbl. daily)	Yields (per cent) Gasoline	Kerosine	Distillate	Residual
1937	3,242	43.9	5.5	12.4	26.4
1938	3,192	44.3	5.5	13.0	25.3
1939	3,391	45.0	5.5	13.1	24.7
1940	3,536	43.1	5.7	14.2	24.4
1941	3,861	44.2	5.2	13.4	24.3
1942	3,655	39.8	5.1	14.7	26.9
1943	3,917	37.1	5.0	14.8	29.2
1944	4,551	39.4	4.7	14.4	27.7
1945	4,711	40.9	4.7	14.5	27.3
1946	4,740	39.6	6.0	16.6	24.9
1947	5,075	40.2	6.0	16.8	24.2
1948	5,549	40.3	6.0	18.7	22.9
1949	5,326	43.7	5.2	17.4	21.7
1950	5,739	43.0	5.6	19.0	20.2
1951	6,494	42.4	5.7	20.0	19.7
1952	6,670	43.0	5.4	21.3	18.6
1953	7,000	43.9	4.8	20.7	17.6
1954	6,958	43.8	4.8	21.3	16.4
1955	7,480	44.0	4.3	22.0	15.3
1956	7,937	43.4	4.2	22.9	14.7
1957	7,919	43.8	3.8	23.1	14.4
1958	7,642	45.2	3.9	22.4	12.9
1959	7,989	44.9	3.7	23.0	11.8

Runs by districts in the U. S.

(Thousands of barrels daily)

	1924	1929	1934	1939	1944	1949	1954	1955	1956	1957	1958	1959	% of total 1959	% of total 1929
East Coast	369	472	471	527	702	768	1,030	1,065	1,126	1,194	1,105	1,117	14.0	17.5
Appalachian 1	(*)	(*)	72	83	100	92	103	98	101	102	94	96	1.2	(*)
Appalachian 2	60	93	26	37	54	63	83	96	102	94	100	103	1.3	3.4
Ill., Ind., Ky.	154	302	326	525	762	915	1,276	1,369	1,405	1,386	1,384	1,465	18.3	11.2
Minn., Wis., Dak.	(†)	(†)	(†)	(†)	(†)	(†)	(†)	(†)	86	95	99	104	1.3	(†)
Okla., Kans., Mo.	218	316	260	308	364	425	601	671	685	704	711	725	9.1	11.7
Texas Inland	85	155	170	179	225	217	238	254	272	270	272	285	3.6	5.7
Texas Gulf	257	425	492	915	1,118	1,283	1,689	1,841	1,957	1,886	1,744	1,846	23.1	15.7
Louisiana Gulf	100	139	113	133	231	432	573	656	696	649	667	706	8.8	5.1
Ark., La. Inland	35	68	52	68	77	75	88	91	94	91	96	89	1.1	2.5
New Mexico	(‡)	(‡)	4	5	11	12	19	21	24	26	24	24	0.3	(‡)
Other Rocky Mountain	73	70	40	67	102	165	238	255	268	273	266	290	3.6	2.6
West Coast	408	666	428	544	805	879	1,020	1,063	1,121	1,149	1,080	1,139	14.3	24.6
Total U. S.	1,759	2,706	2,454	3,391	4,551	5,326	6,958	7,480	7,937	7,919	7,642	7,989	100.0	100.0

*Included in Appalachian 2. †Included in Ill.-Ind. and Okla.-Kans. ‡Included in Rocky Mountain.

return to even a minimum desirable level with relation to capacity.

Last year's record. Crude runs gained 4.5% in 1959, but the figure is misleading. Runs were unusually low in 1958, as refiners recovered from a serious oversupply following Suez. Runs in 1959 once again outstripped demand.

On product yields, gasoline dropped slightly from 45.2% to 44.9%. This is normal. Gasoline yields have wavered up and down very slightly since 1949. Kerosine dropped from 3.9% to 3.7% but this is no doubt due to a partial reclassification of this fuel. Much of this dstillate is now going into jet fuel and is no longer classified as kerosine. Middle-distillate yield grew slightly from a 1958 low. Residual fuel hit the lowest level on record, as refiners resorted to deeper vacuum distillation for cat cracking, and further coking of heavy stocks. The improving asphalt market also diverted residual stocks from end use as fuels.

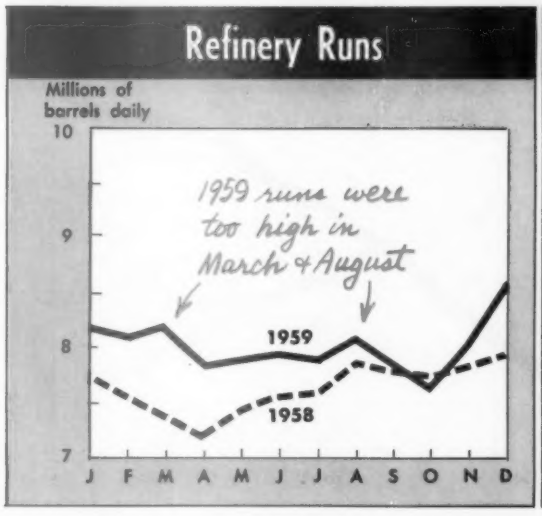
In the level of refining activity, the Gulf Coast continues to show greater gains than the East Coast. Even though much Gulf Coast output moves to Eastern markets, many refiners still find it generally more economical to refine in Texas and Louisiana than along the eastern seaboard. The greatest percentage gain in refining operations since World War II is to be found in the Rockies.

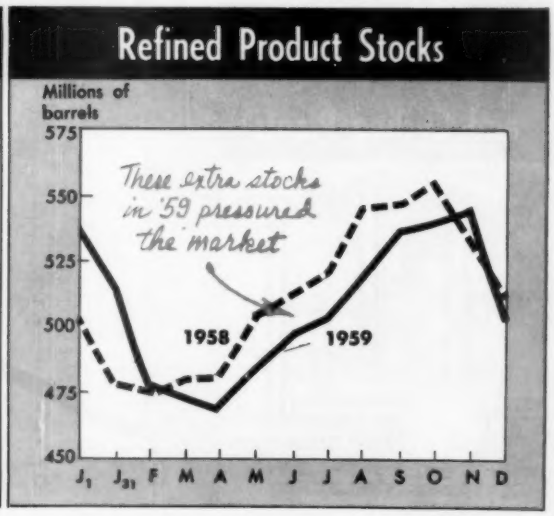
Gasoline octanes moved up moderately during 1959. Premium showed an average gain of 0.3 research numbers and regular grade nearly a full number. There appears to be little pressure on octanes for the coming year, from Detroit. Most upward moves will probably be generated by competition within the oil industry.

Major-product yield by districts, '59

(Per Cent of Crude Plus Unfinished Rerun)

	Gasoline	Kerosine	Distillate	Residual
East Coast	41.3	2.5	28.0	13.8
Appalachian 1	41.8	4.0	22.0	9.6
Appalachian 2	51.1	5.6	18.2	12.3
Ill., Ind., Ky.	49.2	4.7	21.6	11.4
Minn., Wis., Dak.	46.5	5.1	24.4	12.4
Okla., Kans., Mo.	48.7	1.9	25.4	3.5
Inland Texas	46.7	2.7	16.9	7.3
Texas Gulf	45.3	5.5	26.0	8.9
La. Gulf	45.4	7.7	23.4	6.8
N. La. and Ark.	34.8	4.5	22.0	6.6
New Mexico	44.3	1.6	18.8	9.8
Other Rocky Mtn.	44.2	1.2	21.4	11.7
West Coast	39.8	0.4	15.6	24.4
Total U. S.	44.9	3.7	23.0	11.8





Gas-liquids output hits all-time high

Declining trend is reversed as LPG demand continues to grow

BOOMING SALES OF LPG pushed production of liquids to an all-time high in 1959. The outlook is for more of the same in 1960.

Total production of liquids at natural-gasoline and cycling plants averaged 36,728,000 gal. daily last year, compared with only 33,916,000 gal. daily in 1958—a gain of 8.3%.

This good showing is partially a result of the low production average in the 1958 recession year. But more than anything, it is the result of the growing popularity of LPG.

The outlook for plant production in 1960 is good. Output of all liquids is expected to hit 38,230,000 gal. daily, for an increase of 4.1%. LPG production is expected to gain 9% in 1960.

LPG is accounting for more and more of the lion's share of liquids produced at natural-gasoline and cycling plants. It represents 58.3% of the 1959 total production, compared with 54.8% in 1958 and only 36.1% in 1949. On the other hand, natural-gasoline production is steadily decreasing.

Plant production of LPG accounted for all the gain in 1959. Output averaged about 21,425,000 gal. daily, an increase of 2,842,000 gal. daily. This is a 15.3% gain.

In comparison, total production showed a gain of 2,812,000—less than the LPG gain.

Natural-gasoline production averaged 11,570,000 gal. daily in 1959, down 362,000 gal. daily. Other products showed a good percentage gain but a small volumetric gain of 332,000 gal. daily.

Trend reversed. The 8.3% over-all gain in liquids production in 1959 reverses a declining trend which started in 1956.

Total production gained only 3.7% in 1956, the lowest percentage gain since 1946. In 1957, the percentage gain was only 1.1%. And in 1958, production actually decreased 0.1%.

While total production fell in 1958, LPG production gained 1.9%. This was the smallest gain ever reported by the Bureau of Mines since it started the breakout of LPG figures in 1942.

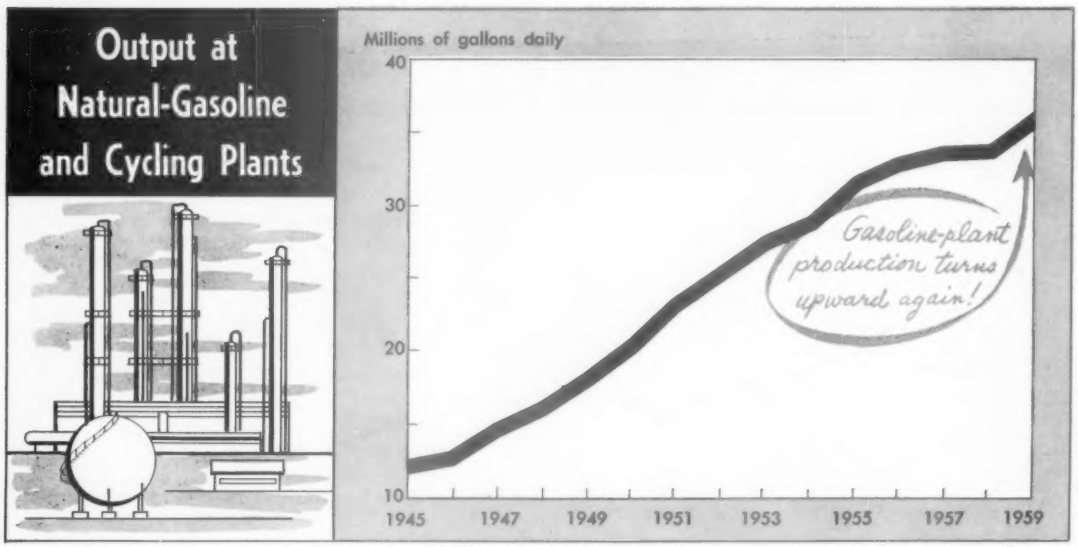
LPG's growth. Part of the big shift toward LPG production can be credited to processing changes at refineries.

In the past, large volumes of Grade 26-70 natural gasoline were delivered to refineries from natural-gasoline plants. This grade contained a high percentage of butane. In recent years, demand for 26-70 for blending at refineries has decreased.

On the other hand, there is a growing demand for butane as raw material for the petrochemical industry and as basic feed stock for the production of alkylate. After the butane is removed, the remaining portion of the natural-gasoline stream is shipped to refineries where the material is reprocessed for octane improvement.

Evidence of this trend is found in the plant production figures. Output of butane at plants increased 20% in the first 10 months of 1959 in contrast with a 3% decrease in natural-gasoline production.

Butane was in high demand for use in production of synthetic rubber last year. In the first 10 months



of 1959, output of synthetic rubber was up almost 33% over the record high for the same months of 1958.

This expansion in butane demand created a near-shortage in the last half of 1959. Some distributors of LPG were shifting their residential and commercial customers to mixtures containing higher percentages of propane.

If chemical and refinery demands for butane continue to increase sharply, all heating demands may be met out of propane production.

Sales and storage. Sales of LPG in 1959 climbed to an estimated 8,693,000,000 gal. for the year, a gain of 16.5% (OGJ, Dec. 21, 1959, p. 45).

The biggest percentage gain in 1959 was in sales of LPG to the chemical and rubber industries, but the big market is still for household and farm use, and for motor fuel.

Greater LPG sales are reflected not only in production figures, but also in record storage.

Underground storage capacity for LPG in the U. S. now stands at well over 2,000,000,000 gal., a 15% increase over 1958. The greatest portion of this capacity is in salt formations, but more and more companies are turning to caverns mined out of shale, chalk, limestone, and granite (OGJ, Sept. 28, 1959, p. 75).

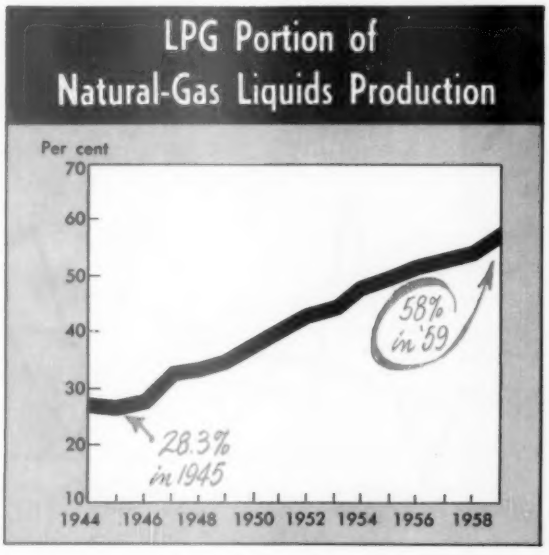
This capacity is being used this winter as never before.

Building up inventories for the winter season, the industry had a record 1,064,000,000 gal. of LPG and LRG actually stored in caverns and formations throughout the nation by the end of September 1959.

By mid-December, cold weather had pulled the stocks down to about 783,000,000 gal.

The record inventory in September 1959 is much higher than the previous all-time high of about 777,000,000 gal. in the fall of 1957.

The relatively cheap underground storage of LPG has become a very important factor in the stability of the LPG industry.



Product Output by Years

(Thousands of gallons daily)

	LP-gas	Natural gasoline	Other	Total	Per cent increase: Total	Per cent increase: LPG
1945	‡3,562	‡7,157	2,171	12,890	12.3	11.4
1946	3,763	7,472	2,083	13,318	3.3	5.7
1947	5,074	7,627	2,507	15,208	14.2	34.8
1948	5,880	8,295	2,659	16,834	10.7	15.9
1949	6,518	8,388	3,171	18,077	7.4	10.9
1950	8,198	8,963	3,780	20,941	15.8	25.8
1951	9,761	9,832	3,969	23,562	12.5	19.1
1952	11.445	10,277	3,923	25,645	8.8	17.2
1953	12,659	10,769	4,023	27,451	7.0	10.6
1954	14,259	11,248	3,507	29,014	5.7	12.6
1955	16,363	12,214	3,801	32,378	11.6	14.8
1956	17,725	12,128	3,738	33,591	3.7	8.3
1957	18,234	12,327	3,383	33,944	1.1	2.9
1958	18,583	11,932	3,401	33,916	—0.1	1.9
1959*	21,425	11,570	3,733	36,728	8.3	15.3
1960†	23,350	11,100	3,780	38,230	4.1	9.0

*Ten months actual, two months estimated. †Forecast. ‡Isopentane included in natural gasoline, starting with 1945.

Total Plant Production by Years

(Thousands of gallons daily)

	1954	1955	1956	1957	1958	1959*
Appalachian	521	899	770	741	730	957
Ill.-Mich.	929	961	1,025	1,070	1,038	1,020
Kentucky	520	614	777	578	517	604
Kansas	567	580	534	610	618	624
Oklahoma	2,553	2,784	2,920	2,871	3,008	3,093
Nebraska	(†)	130	200	213	241	285
Arkansas	298	286	266	257	249	245
Louisiana	2,621	2,940	2,947	3,041	3,271	3,706
Gulf	1,130	1,386	1,582	1,607	1,932	2,010
Inland	1,491	1,554	1,365	1,434	1,339	1,696
Mississippi	118	97	97	96	96	95
New Mexico	1,235	1,478	1,684	1,877	1,962	2,387
Texas	15,662	17,640	18,294	18,565	18,242	19,540
Texas Gulf	3,587	3,885	3,942	4,155	4,035	4,428
West Texas	4,612	5,737	5,987	6,278	6,078	6,622
East Texas	1,214	1,197	972	883	676	753
Panhandle	2,070	2,591	2,716	2,741	2,765	3,142
Other Texas	4,179	4,230	4,677	4,508	4,688	4,595
Rocky Mtn.	374	433	560	644	667	828
California	3,616	3,536	3,517	3,381	3,277	3,344
Total U. S.	**29,014**	**32,378**	**33,591**	**33,944**	**33,916**	**36,728**

*Ten months actual, two months estimated. †Included with Kansas.

Product Output of Natural-Gasoline and Cycling Plants—1959*

(Thousands of gallons daily)

	LP-gas	Natural gasoline	Other	Total	Per cent increase
Appalachian	872	84	1	957	31.1
Ill.-Mich.	962	54	4	1,020	—1.7
Kentucky	498	106	....	604	16.8
Kansas	340	283	1	624	1.0
Oklahoma	1,863	1,222	8	3,093	2.8
Nebraska†	224	61		285	18.3
Arkansas	148	86	11	245	—1.6
Louisiana	1,375	844	1,487	3,706	13.3
Gulf	692	550	768	2,010	4.0
Inland	683	294	719	1,696	26.7
Mississippi	21	44	30	95	—1.0
New Mexico	1,649	695	43	2,387	21.7
Texas	11,852	5,761	1,927	19,540	7.1
Texas Gulf	2,199	1,476	753	4,428	9.7
West Texas	4,856	1,737	29	6,622	9.0
East Texas	508	238	7	753	11.4
Panhandle	2,027	1,089	26	3,142	13.6
Other Texas	2,262	1,221	1,112	4,595	—2.0
Rocky Mtn.	489	323	16	828	24.1
California	1,132	2,007	205	3,344	2.0
Total U. S.	**21,425**	**11,570**	**3,733**	**36,728**	**8.3**

*Ten months actual, two months estimated. †Includes North Dakota.

Stock and price troubles furrowed marketing brows all year

OIL HAD AN UNEASY YEAR in the market place during 1959.

It was a year characterized by soft product prices and declining refinery realizations.

Crude prices generally held steady in spite of sporadic cuts in many spots over the oil country.

In products marketing, the big effort continued toward gallonage volume and trimming costs of doing business.

Stock troubles. Three important factors contributed to the products oversupply and soft markets during the year:

. . . **Tardy buying** of distillates by jobbers and home owners.

Distillate stocks on the Gulf and East coasts have been too high since early last spring. Summer discounts were started a little early in the year to promote a summer-fill program for home owners. There is evidence, however, that summer sales of distillate for filling consumer storage were below normal until about September.

. . . **High yield of distillate** from a barrel of crude.

This yield was particularly high on the East Coast. Refiners there made about 0.82 gal. more distillate from a barrel of crude in the first 9 months of 1959 than they did in the same months of 1958. In the first quarter of the year they averaged about 1.2 gal. more distillate from a barrel than in the corresponding quarter of 1958.

Yields of distillate in Texas Gulf Coast refineries for the early part of the year were running better than 29% of crude. This is about in line with yields in the early months of 1957 when refiners were making extra distillate to meet European demands during the Suez crisis.

The high yields and delayed distillate buying were aggravated by high refinery runs at both Gulf and East coast refineries.

While trouble in distillates developed on the two important coastal markets, interior refiners had gasoline trouble. In District 2, a relatively small surplus of gasoline set off a selling spree that kept prices at rock bottom for most of the summer.

. . . **Trend toward increasing inventories** faster than the gain rate for demand.

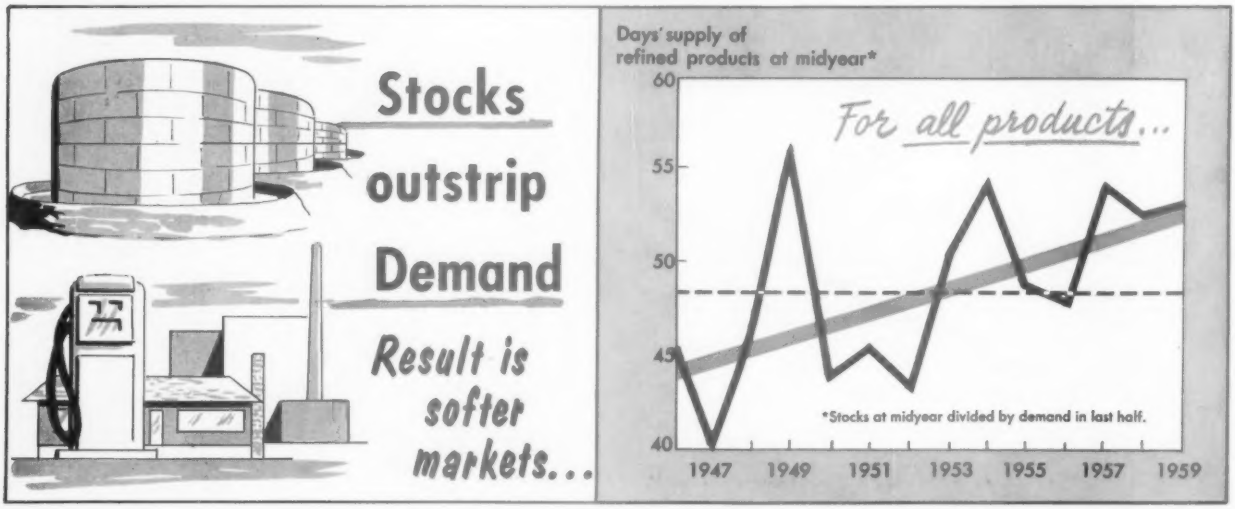
This trend (see charts) has been developing since 1946 and is a big factor contributing to overflowing product tanks and low prices.

How the trend has developed is seen by these statistics: At the end of June 1947, total refined products in storage amounted to only 41.3 times daily average demand for the last half of the year. For the same period in 1959, the ratio of stocks to demand was 53.1 with the median for the 13 years at 48.3. A similar trend also developed for gasoline and distillate stocks individually.

Price picture. Refiners' failure to shift gears with the season played a big role in price troubles last year.

Prices actually were stronger at the start of 1959 than they were for the same time in 1958 due to cold weather which spurted demand for No. 2 fuel. The Group 3 market for No. 2 moved up ¼ cent in the last week of January, and the Gulf Coast price moved up 1 cent to 9.625 cents.

The high demand for distillates on the East



Coast and heavy shipments from the gulf created a very tight market. At the end of January, distillate stocks on both coasts were lower than for the same date in both 1957 and 1956.

Gasoline markets on the other hand, started out the year on the sick side. Generally low gasoline prices at the end of 1958 had dropped true service-station prices of housebrand gasoline to the lowest price in 40 years. Markets still were soft at the end of January 1959. On the Gulf Coast, 90-octane gasoline sold for about 9.75 cents, only slightly above the quotation for No. 2 fuel. Before the year ended, however, distillate was very soft and gasoline had firmed up, although it was not tight either.

In March, the development occurred that really hurt the markets: Refiners failed to make their usual slowdown. Experience shows that demand in March drops about 7% from the average during January and February. Refiners, however, actually ran 80,000 bbl. daily more crude in March than in February. The net result was an increase of 6,800,000 bbl. in product inventories during the month.

This abnormal boost in new supply for March had a very distinct effect on product markets for the remainder of the year. Stocks continued to climb at a near-normal rate until by the end of June total for the four products reached 400 million barrels. This was considered excessive by 25 million barrels.

The stock excess prompted refiners to trim crude runs by about 100,000 bbl. daily in July. But strangely they reversed this in August and boosted runs about 200,000 bbl. daily which sent stocks up 26,600,000 bbl.

This big gain—out of line for demand in the late summer — was a factor in the weak markets which developed from then into the heating season.

Some trends. The price of crude also eased downward during the year.

The Bureau of Mines reported the average value of crude oil at the well in 1959 was $2.94 a barrel, off 7 cents from 1958.

The cuts ranged from 7 to 50 cents a barrel. Cuts of 7 cents were posted in North Texas, the Texas Panhandle, and Southwest Texas; 10 to 50 cents in California, later adjusted to only 5 to 25 cents; 30 cents in Four Corners area; 20 cents in East Texas; 25 to 45 cents in Montana; and 15 cents in Southwest Kansas and the Oklahoma Panhandle.

Average value of natural-gas liquids, meanwhile, remained unchanged at 5.6 cents per gallon. Value at the wellhead of natural gas increased to 12.1 cents per M.c.f. from 11.9 cents.

In spite of the crude cuts, the refiners' income from a barrel of crude products just kept falling. In the Mid-Continent area, refinery realization stood at $4.09 a barrel at the start of 1959 but slipped to $3.63 by December. On the Gulf Coast, the decline was from $3.83 to $3.58.

Representative product prices

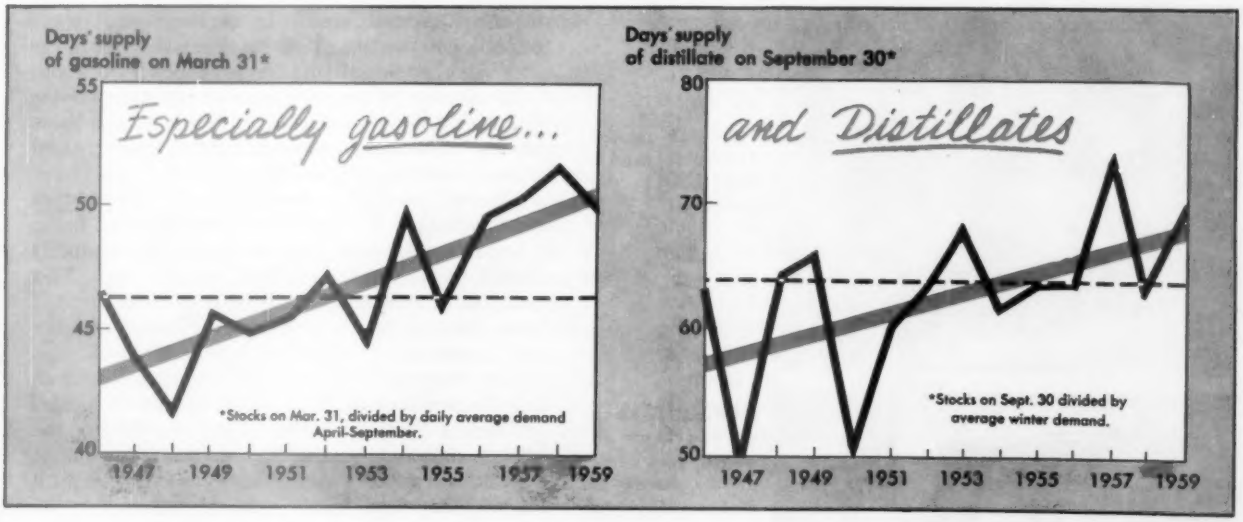
Spot-Market Quotations of Leading Suppliers
(Cents per gallon except dollars per barrel for residual)

GROUP 3

	Regular gasoline	Kerosine	No. 2 distillate	No. 6 residual
January	11.50-11.63	10.56-10.63	9.56-9.63	1.85-1.91
February	11.25-11.63	11.00-11.00	10.00-10.00	1.98-2.03
March	11.47-11.83	10.75-10.94	9.75-9.94	2.00-2.05
April	11.63-12.00	10.45-10.70	9.45-9.50	1.90-2.02
May	11.50-11.88	10.00-10.13	9.00-9.13	1.85-2.00
June	11.38-11.75	9.56-9.88	8.50-8.88	1.85-2.00
July	10.98-11.30	9.25-9.75	8.25-8.75	1.85-2.00
August	11.69-12.00	9.25-9.75	8.25-8.75	1.78-1.93
September	11.35-11.75	9.00-9.50	8.00-8.50	1.59-1.72
October	10.88-11.25	9.19-9.50	8.19-8.50	1.40-1.60
November	10.56-10.94	9.75-9.81	8.75-8.81	1.53-1.65
December	10.25-10.35	10.25-10.35	9.25-9.30	1.78-1.90

GULF COAST

January	10.19-10.50	10.06-10.06	9.56-9.56	2.00-2.00
February	10.09-10.50	19.38-10.38	9.88-9.88	2.00-2.00
March	10.19-10.50	10.38-10.38	9.88-9.88	2.00-2.00
April	10.40-10.65	9.90-9.98	9.40-9.48	2.00-2.00
May	10.44-10.75	9.25-9.31	8.75-8.81	2.00-2.00
June	10.06-10.31	8.63-8.66	8.13-8.16	2.00-2.00
July	10.70-10.83	8.45-8.58	8.13-8.35	2.00-2.00
August	11.00-11.00	8.44-8.56	8.03-8.16	2.00-2.00
September	11.00-11.00	8.35-8.43	7.88-7.95	2.00-2.00
October	10.88-11.00	8.63-8.63	8.13-8.13	2.00-2.00
November	10.75-11.00	8.63-8.63	8.13-8.13	2.00-2.00
December	10.60-10.85	9.18-9.18	8.33-8.33	2.00-2.00



Oil Marketing Saw Some Sharp Changes in '59

CUSTOM blending at the gasoline pump goes West.

CREDIT-CARD battle makes many look at their hole cards.

PORTABLE service stations make their bow in the Southwest.

MORTALITY rate of stations so high, special study made to find out why.

MANY MARKETING TRENDS that became apparent last year will continue as practices or problems of the oil industry during 1960.

That's particularly true of the many sales and mergers of independent marketing concerns with the majors.

Back of this trend was the desire of majors to increase gallonage and in some instances a desire to push into private-brand marketing.

The independents, for their part, got handsome prices. They were not selling at distress prices. The usual reasons often involved greater need for capital to expand than the independent cared to invest or a personal desire to cash in on a lifetime of plowed-back earnings.

New sales approach . . . Gasoline blending at the pump, meanwhile, spread westward during 1959.

Originally introduced by Sun Oil Co., custom blending now has been adopted by El Paso Natural Gas Co., Hancock Oil Co., and Lion Oil Co. This puts the multigrade pumps in West Texas, New Mexico, Nevada, California, and Arkansas in addition to Sun's 22-state marketing area in the East. British Petroleum also has introduced the system in West Germany. Others are testing pumps in Canada and the U. S. Midwest.

Other gasoline-marketing developments: California Standard went the third-grade route with a superpremium fuel for the West Coast and Hawaii. Many other West Coast marketers paced by Union Oil Co., concentrated more on upgrading their regulars. Idea of selling motor fuel a la carte on supermarket parking lots gained ground.

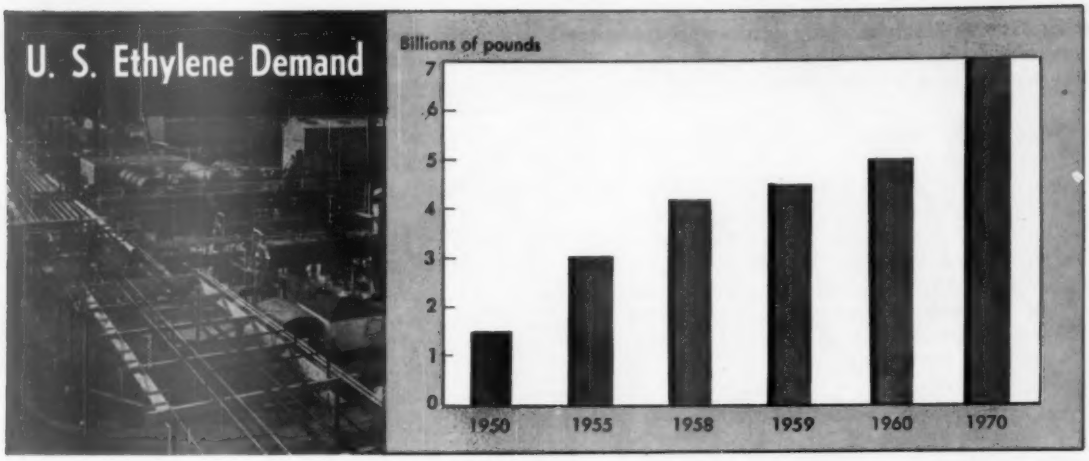
Fight for business . . . Some strange things are happening to service stations. Shell attacked the problem of high turnover in station operators by cutting down on the number of its stations and concentrating on fewer but bigger outlets. The move increased per-station throughput 120% and reduced company costs. Some other majors are known to be experimenting seriously with the same approach.

Independents came up with an innovation at the opposite end of the scale—skid-mounted, portable stations. Designed strictly for a low-priced, high-volume operation based on gasoline sales, the portables can be moved quickly to a better location.

In answer to the old question of why service stations fail, a survey during 1959 pinpointed these reasons: Insufficient working capital, poor record keeping, inadequate training.

One of the year's interesting competitive battles was the struggle for credit-card business. The battle of credit cards plus easy treatment of deadbeats pushed credit costs up 300% in 10 years. This forced marketers in 1959 seriously to examine their credit practices and at year's end several companies were investigating a universal petroleum card.

On the political scene: Rep. James Roosevelt kept the pressure on for an investigation of alleged coercion in TBA marketing by majors. Dealers and jobbers continued to debate whether fair trading gasoline was good or bad. And a consent settlement was reached in the West Coast antitrust suit.



Continued petrochem growth assured

A RECORD 27 billion dollars in total chemical sales is possible for 1960, says the Business and Defense Services Administration. This is a 9% gain over last year. A 20% increase in capital spending is also predicted for the industry in 1960.

Helping push the chemical industry to record sales is a healthy and expanding economy, highlighted by recovery of the automobile industry and high government spending for defense. Since the strong demand is benefiting all segments of the industry, petrochemicals should get their fair share of the market.

Continued growth of petrochemicals in the 1960's can be safely predicted based on all the planned expansions for production of olefin raw materials, if nothing else.

Olefins. Ethylene is still holding top spot as the major olefinic raw material among basic petrochemicals. Use of ethylene for chemical manufacture is expected to reach 5 billion pounds in 1960 and 7 billion pounds by 1965. This compares with use of about 4.5 billion pounds last year.

Production of butadiene, butyl rubber, and miscellanous chemicals will probably consume 3.5 billion pounds of butylenes in 1960 and 4.3 billion pounds in 1965, compared to about 3 billion pounds in 1959. This puts the C_4 olefins the second most prominent olefin raw material for basic petrochemical manufacture.

Also, propylene seems to be well on its way toward chemical prominence as a major olefinic raw material as it falls into third place closely behind the butylenes. The propylene and propylene-derivatives expansions already known in the trade, plus a raft of other possibilities, may well push propylene use for chemical manufacture to an impressive 2.2 billion pounds in 1960 and close to 3.1 billion by 1965. This compares with last year's figure of 1.9 billion.

Plastics. Output of plastics in 1959 soared 25% above 1958, and 1960 production should jump some 10% above 1959. Polyethylene, polyesters, vinyls, and miscellaneous resins are leading the way. Two groups celebrated 1959 by breaking the 1-billion-pound level: Polyethylene at 1.2 billion and vinyls at 1.5 billion. Also knocking at the door was the styrene group with last year's output hitting 940 million pounds.

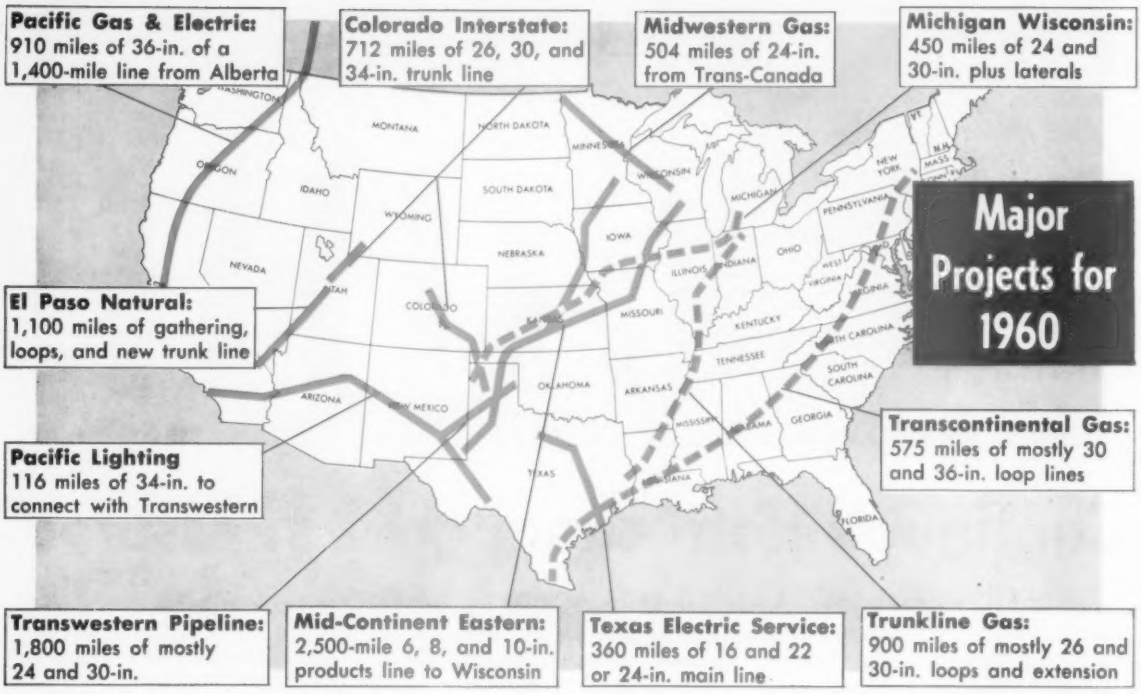
Foreign. The U. S. is still the No. 1 petrochemical producer, but the rest of the world is taking giant steps to meet the increasing demand for petroleum-derived products. Our potential for increased exports appears to be in new products and those not yet made abroad. Their rapid placement on the international market will be a major factor in helping U. S. exporters in the tough period of competition ahead.

Western Europe is busy trying to catch up with the U. S. in petrochemical production. Construction of many new plants and expansion of existing facilities will strongly influence U. S. chemical industry's foreign trade in the years ahead. Most of the construction and expansion is in such countries as France, Italy, and England.

But western Europe and the U. S. are not the only areas where petrochemical capacity is growing. At least a half-dozen projects are under way or planned for Japan. Japanese petrochemical producers have spent about $230,000,000 in plants in the past 5 years and are seeking government approval for another $390,000,000 in petrochemical investments during the next 5 years.

While Japan still depends on petrochemical imports to fill all its fast-growing needs, domestic production has already saved Japanese manufacturers from spending $120,000,000 or more for petrochemical imports. Producers are eager to make greater advances over the next 5 years.

Undoubtedly, both Soviet Russia and Red China will expand efforts to compete in world chemical markets, but the potential threat is still much greater than the actual one.



Banner year seen for pipelining

ONE OF U. S. pipeline construction's biggest years is in prospect for 1960, continuing the upturn which started a year ago.

There are some sizable "ifs" which have a bearing on U. S. and Canadian projects—some regulatory, some political, some financial—but a world-wide survey of companies by The Oil and Gas Journal points to an increase in construction. And 1959 was a much bigger year in the United States and abroad than was 1958.

Here is the 1960 outlook, based on reports of what operating companies themselves expect to construct:

. . . **U. S. natural gas**—13,550 miles compared with 13,500 miles in 1959.

. . . **U. S. crude**—1,100 miles compared with 1,900 miles in 1959.

. . . **U. S. products** — 3,000 miles compared with 1,300 miles in 1959.

. . . **Canadian natural gas**—1,100 miles compared with 950 miles in 1959.

. . . **Canadian crude**—600 miles compared with 280 miles in 1959.

. . . **Foreign** — 5,600 miles compared with 6,700 miles in 1959.

In spite of the decline in foreign construction expected this year, the level abroad will still be above 1958 and the world total for 1960 will be higher than either of the two previous years. The foreign dip will be more than offset by increases in U. S. and Canadian construction.

U. S. Natural Gas

This year should see some 2,550 miles of natural-gas line laid in excess of 1958, when expansion programs were frustrated by the Memphis decision, later reversed by the U. S. Supreme Court. This means a continuation of the 1959 level, which was a near-record pace.

The industry is not without regulatory obstacles to orderly expansion. Still unsettled are problems of speeding up processing of rate cases before the Federal Power Commission, and determining initial prices which pipelines may pay producers for gas. The prospect is for certificate cases to get more complex unless legislation is passed to spell out rules and procedures. Examples of this are the CATC and Transco cases, both back before the FPC to determine initial prices after trips to the U. S. Supreme Court.

But for all this ponderous regulatory procedure, expansion programs do clear FPC and 1960 will be no exception.

The biggest project of the year is already under way. It's Transwestern Pipeline Co.'s 1,800-mile line from Texas to California, due for completion in July. The $193-million project will introduce a second supplier of out-of-state gas to the California market in competition with El Paso Natural Gas Co.

If Transwestern is hurting El Paso's growth, it isn't noticeable. For El Paso has planned this year an 1,100-mile program, including loops on its Permian basin

and San Juan basin systems and a new 34-in. line from Provo, Utah, to the California border.

In connection with this project, Colorado Interstate Gas Co. will lay some 700 miles of trunk line between the Texas Panhandle and Denver and between Green River, Wyo., and Provo, Utah. At that point CIG will deliver gas from its own system and from Pacific Northwest Pipeline Corp. to El Paso for California customers. This case could be through FPC some time in the spring.

Trunkline Gas Co. will be completing a 900-mile 26 and 30-in. looping and extension to Michigan, delayed by the steel strike.

Major projects which are expected to clear FPC for 1960 construction also include Northern Natural Gas Co., Michigan Wisconsin Pipe Line Co., Natural Gas Pipeline Co. of America, and Peoples Gulf Coast Natural Gas Pipeline Co. (formerly Texas Illinois). Texas Electric Service Co. plans a 360-mile intrastate line from the Houston area to Fort Worth area power plants.

Much of the planned U. S. construction must wait on export authority from the Canadian Government. Some 2,000 miles of pipe is involved. Pacific Gas & Electric Co. plans almost 1,000 miles of construction on the U. S. segment of the 1,400-mile 36-in. line from Alberta to San Francisco. PG&E and other companies connected with the line plan to build it over a 2-year period, starting this year. FPC hearings are winding up, and a quick favorable decision is expected, pending Canadian export approval.

Midwestern Gas Transmission Co., a Tennessee Gas Transmission Co. subsidiary, also has a 504-mile 24-in. line at stake in the Canadian gas hearings which began this month. The FPC has already cleared this project, extending from the Trans-Canada Pipe Lines, Ltd., line at Emerson, Man., to Marshfield, Wis.

U. S. Crude Oil

Crude-line construction fell off last year by about one-third, as capacity has been more than adequate to meet demand. And this year is expected to be below 1959. No major trunkline construction has been announced, and none was indicated in confidential company replies.

However, short loops, the continual process of connecting new fields, will buoy construction somewhat. And the improvement in demand may soon require construction of some projects which have been shelved because of the world crude surplus.

U. S. Products

Whether 1960 will be a large or small year for products construction hinges on one project: the 2,500-mile 6, 8, and 10-in. LPG-natural gasoline line proposed by Mid-Continent Eastern Pipeline Corp., a venture of the Missouri-Kansas-Texas Railroad, from Texas to Wisconsin. Right-of-way buying and engineering started this month while investment bankers studied its economic feasibility. At mid-January preliminary indications were favorable.

Canada

Canada can expect a rebound from a poor 1959, although this year still won't be anything like 1958, if the Canadian Government decides the country can spare the gas dedicated to U. S. markets mentioned previously. Alberta Gas Trunk Line Co. will build 336 miles of the Alberta-San Francisco gas line as well as a 122-mile expansion of its system serving Trans-Canada's line to Montreal. Trans-Canada will build 124 miles of loop and extension in connection with the Midwestern project.

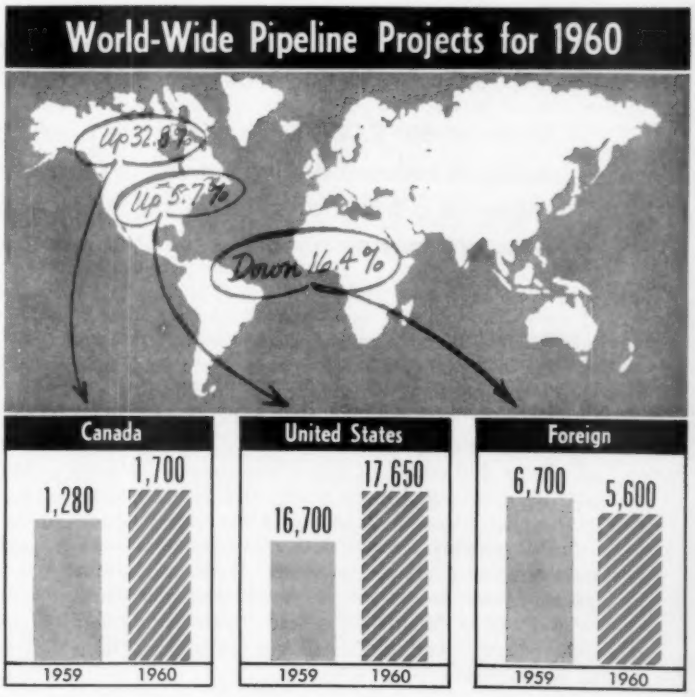
Canada hit bottom last year on petroleum-line construction. There just wasn't any except for gathering lines and a 47-mile condensate line. This year a few hundred miles of crude trunk-line construction is indicated. While several large products projects have been proposed, none appears near the construction stage.

Foreign

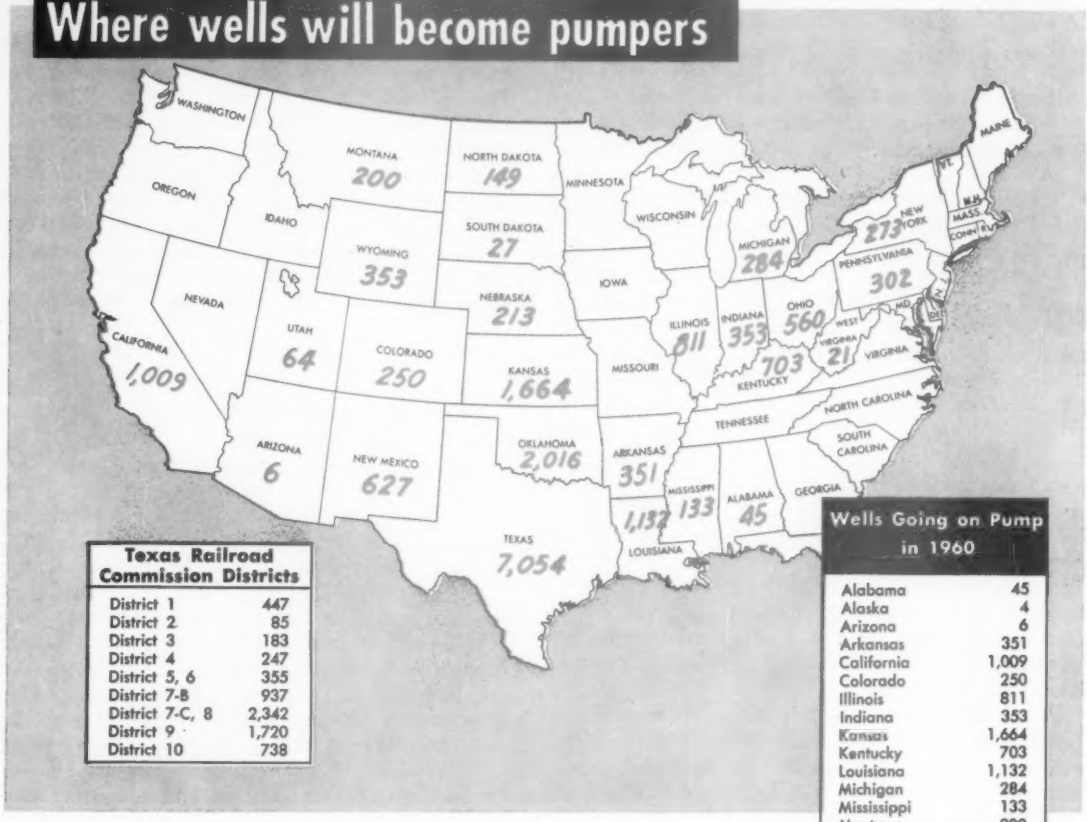
With Argentina's 1,000-mile 24-in. gas line in the ground, foreign construction in this category is expected to dip this year, but projects in Algeria, Mexico, and Russia assure continued activity.

Foreign crude construction will continue at the same high level. Europe has just finished one big-inch line from Wilhelmshaven to Cologne, and the Rotterdam-Rhine line will be finished this year. A newly completed Algerian line (Hassi Messaoud - Mediterranean) and a second under construction will make newly discovered Sahara oil a factor in the world market. Several lines are being studied in Libya. India will soon start a 720-mile line from the big Nahorkatiya field. And Iraq has a major looping program under way.

Argentina's 574-mile 12-in. line was the major foreign products line built last year, and other lines are under way in Iran, Mexico, and Russia, keeping activity at a fairly high level.



Where wells will become pumpers



Texas Railroad Commission Districts

District 1	447
District 2	85
District 3	183
District 4	247
District 5, 6	355
District 7-B	937
District 7-C, 8	2,342
District 9	1,720
District 10	738

Wells Going on Pump in 1960

Alabama	45
Alaska	4
Arizona	6
Arkansas	351
California	1,009
Colorado	250
Illinois	811
Indiana	353
Kansas	1,664
Kentucky	703
Louisiana	1,132
Michigan	284
Mississippi	133
Montana	200
Nebraska	213
New Mexico	627
New York	273
North Dakota	149
Ohio	560
Oklahoma	2,016
Pennsylvania	302
South Dakota	27
Texas	7,054
Utah	64
W. Virginia	21
Wyoming	353
Other	27
	18,631

18,631 new pumpers in '60

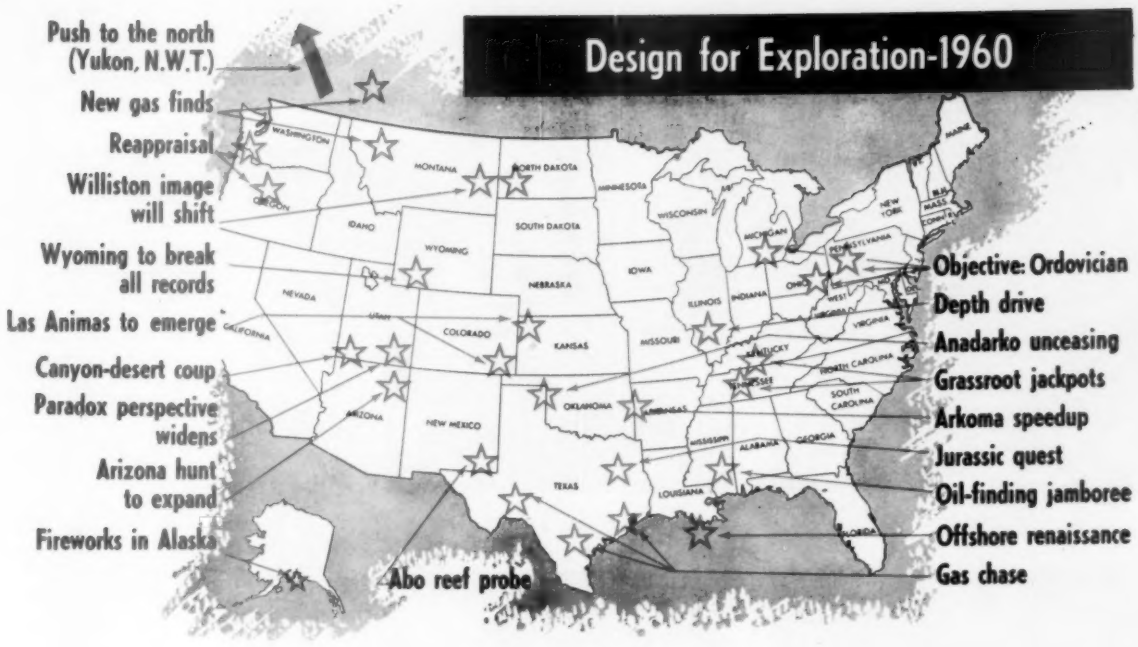
Down about 2,000 from last year's prediction. Decrease is due to reduced drilling activity in some areas. Increases shown in a few states where secondary-recovery operations are moving ahead.

BEFORE 1961 rolls around, 18,631 more wells will be "on the pump." These include new wells and those that are no longer able to flow naturally.

Texas is again in the lead with slightly more than 7,000 new pumpers expected. This is a drop of almost 800 from last year. The reason? Drilling activity is expected to be slower this year by about 500 wells. Most of this drop is expected to come from development wells, with the number of wildcats remaining about the same. With present-day emphasis on gas, a lot of the development wells drilled will be found in gas fields, with fewer oilers than before. And of course gas wells don't have to be pumped.

One of the big surprises comes in Pennsylvania. Normally, there are more wells abandoned in Pennsylvania each year than there are wells drilled, so that the number of pumpers would be on the decline. This year, we are predicting that the Keystone State will be richer by 302 wells, mostly due to the recent increase in the price of Pennsylvania Grade crude oil. New activity is expected in flooding old, semidepleted reservoirs.

The biggest increase of all is expected in Alaska, however. Our calculations show a whopping 300% gain in the number of pumping wells. This year's prediction calls for four pumping wells in Alaska compared with only one for last year.



Where 1960 oil finders will range

WHAT'S in the books for exploration in 1960? The map at the top of this page reveals the principal objectives that should tempt the oil finders this year. They are widely scattered and quite diverse, and should offer plenty of enticement to major and independent alike.

The most intriguing thing about these 1960 objectives is the wide divergence of interest they reveal. In the past 2 years, there's been a decided shift away from the old centers of concentrated drilling into new regions that may offer a better payoff. The continued decline in Texas wildcatting is just one indicator of this move; for the third straight year, the total wildcat score is down in that state. All over the country, a widening of horizons is clearly apparent, and the outlook for 1960 is for more of the same. Here are just a few of the turns that exploration will take this year:

Starting in the East, the deeply buried Lower Paleozoics will be attacked along a broad front throughout the **Appalachian basin.** The Ordovician and Cambrian discoveries of 1959 were something new for this part of the country, and the establishment of exploration offices in Pittsburgh by major companies during the past 2 years indicates that we will be seeing a lot more deep Appalachian wildcats.

Down in the Blue Grass country, the shallow oil pools of **Central Kentucky** have acted like a magnet on independent wildcatters throughout 1958 and 1959, and the sensational strikes at the beginning of 1960 will add fire to the play. Don't be surprised if this splashes over into Central Tennessee, and maybe even as far south as northern Alabama. It's a grassroots bonanza.

The **Illinois basin** has begun to pay off rather handsomely from the deeply-buried Ordovician section, and the emphasis there will concentrate heavily on even greater depth in drilling. This got under way largely in 1959 and will speed up this year.

The **Arkoma basin,** straddling the Arkansas - Oklahoma state line, has emerged as a prolific source of gas. Recent developments point to the multiplicity of pay zones in the Pennsylvanian section, and to an unexpectedly thick section of sediments. Triple and quadruple completions will feature coming events in this active but sparsely explored basin.

Mississippi had its most successful year during 1959 but even that record may be eclipsed in 1960. Outstanding success in uncovering rich, new oil fields plus an intense interest in the possibilities of the Lower Cretaceous and Jurassic rocks, will lead to an even greater campaign in the coming year.

Look for the industry to revive its enthusiasm about **offshore** prospects, beginning immediately. After suffering 4 years of decline since the boom of 1955, the Gulf of Mexico waters once again appear as a tempting target for both large and small operators. Decreased drilling costs plus accelerated demand for gas, and expiration of leases, all will combine to give the big push to offshore operations once again.

Swinging into **Texas,** the principal targets of 1960 lie deep. East Texans will again seek the Smackover along the Mexia fault line, and following its debut as an oil producer there in 1959, the Cotton Valley affords an even deeper goal.

Gulf Coast and West Texas wildcatters will have gas on the brain; gas has replaced oil as the prize in both regions. It's a trend which can only go up in the future.

The five-state Panhandle region shows no sign of a letup in activity, and **Anadarko** will again hum in 1960. The play will spread northwest to envelop the Las Animas arch, thanks

Exploration 1960... A year for new records

... in Arctic lands

... on mountain flanks

... in burning deserts

... and jungle maze

to the recent discoveries of big oil in southeastern Colorado near the crest of this huge anticlinal feature.

In southeast **New Mexico,** the Abo reef trend has expanded beyond earlier expectations and those rich reserves will attract many a wildcat and deeper pool test in the months ahead.

Arizona, rewarded with its biggest oil well last year, may break another record this year in total activity. The Black Mesa basin may at last receive an earnest effort on the part of the wildcatter. In the northwestern part of the state, the "strip country" is expected to see a rash of wildcats, provided a successful strike is made across the line in southwestern Utah's Kaiparowits country—and this could very well come to pass.

In both the **Paradox** and **Williston** basins, 1960 will bring a new perspective, a widening of horizons. Both basins were rewarded last year with highly significant discoveries away from previous areas of concentrated search. Look for more wildcats in the deeper, central part of Williston, and for a wave of remote operations throughout the Paradox. Images are shifting in both these basins.

Wyoming, star performer of the Rocky Mountain region recently, will break all records in 1960, both in total drilling and in discoveries scored. The search for gas will again be accentuated, but oil also is an attractive incentive throughout the state.

The **Pacific Northwest** states are in a state of confusion. Operators are baffled by subsurface complexities that lead to frustrating problems and semi-commercial finds. The need here is for a reappraisal of available data and reinterpretation of underground conditions. It calls for discovery thinking that has not yet appeared in that corner of the country.

The richly rewarding foothills gas belt of southwestern Alberta has nuzzled up to the Montana border and may very well spill over into the Disturbed belt of the U. S. during the coming year. So far only one gas field has been found on the U. S. side and many disappointments have come, but the optimists believe that the gas belt will soon become an international arena.

Alaska should see plenty of exploratory fireworks this year. Expansion of Swanson River field has been most encouraging, and the discovery of Kenai gas field has accentuated Alaska interest. Look for more state and federal lease sales, and ever more exploratory wells in all parts of the state. Already three remote wildcats are on the way down.

Across the Seas

American explorationists, increasingly aware of oil's international role, will continue their overseas trek in ever greater numbers. The spotlight areas will probably be repeats of 1959—Libya, Algeria, the Middle East, and South America.

More and more, the attractions of the Philippines, Australia, and Central America become apparent. Oil-starved Australia, now almost solidly leased, should see some significant deep tests this year—one is going down today and more are in the books. The one discovery in the Philippines will lead to still others.

Argentina will be a beehive of drilling activity for the next several years, but look for a slowdown in Brazil. Ecuador, Bolivia, Peru, and Colombia will probably maintain the status quo in 1960.

Metropolitan France is due for a reappraisal and some surprising developments during 1960. The Paris basin is yet an unknown quantity but its geology, not unlike that of the East Texas basin, should tempt many an aggressive wildcatter in the months ahead.

So it appears that 1960 will sweep the oil industry along with every other phase of our economy, and that we will see unprecedented records set in exploration during the year. During the coming year, from the Arctic Circle in northwestern Canada to Tierra del Fuego, explorers will be at work. It should be an interesting 12 months.

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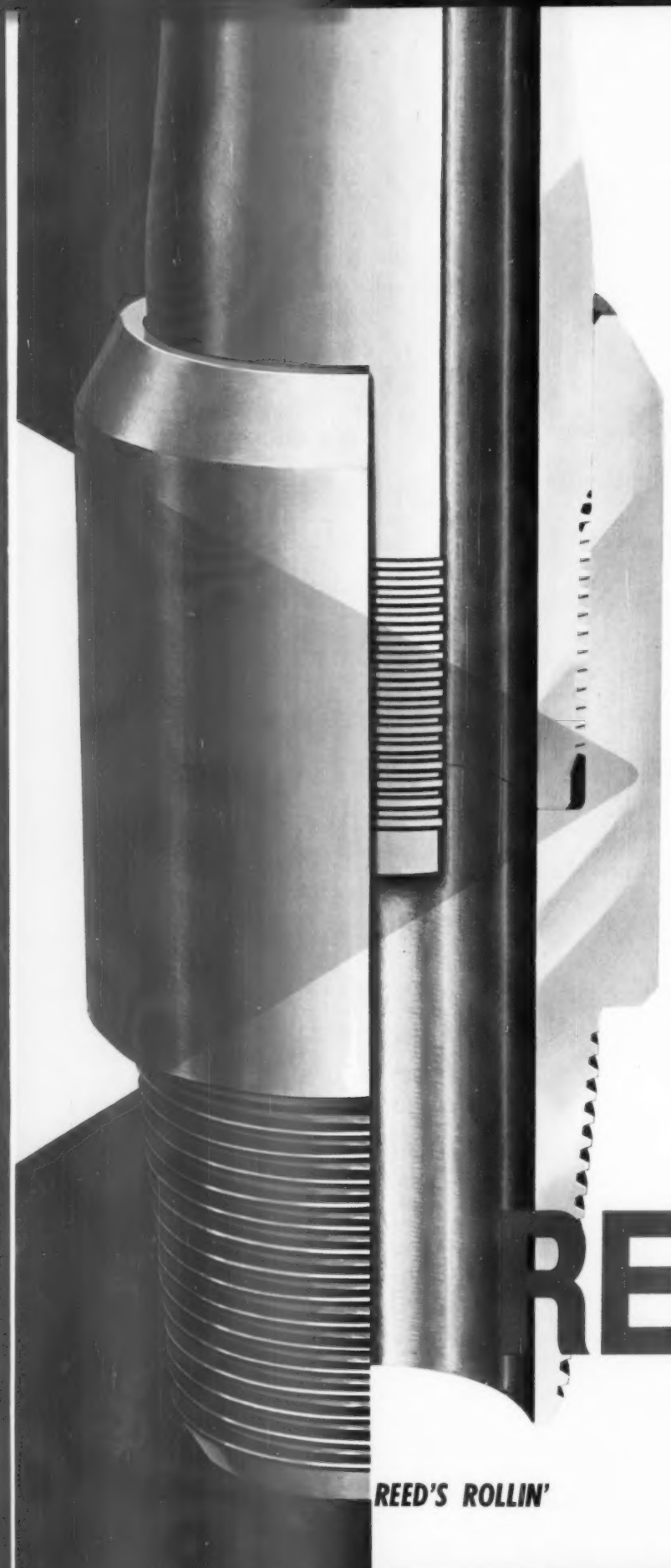

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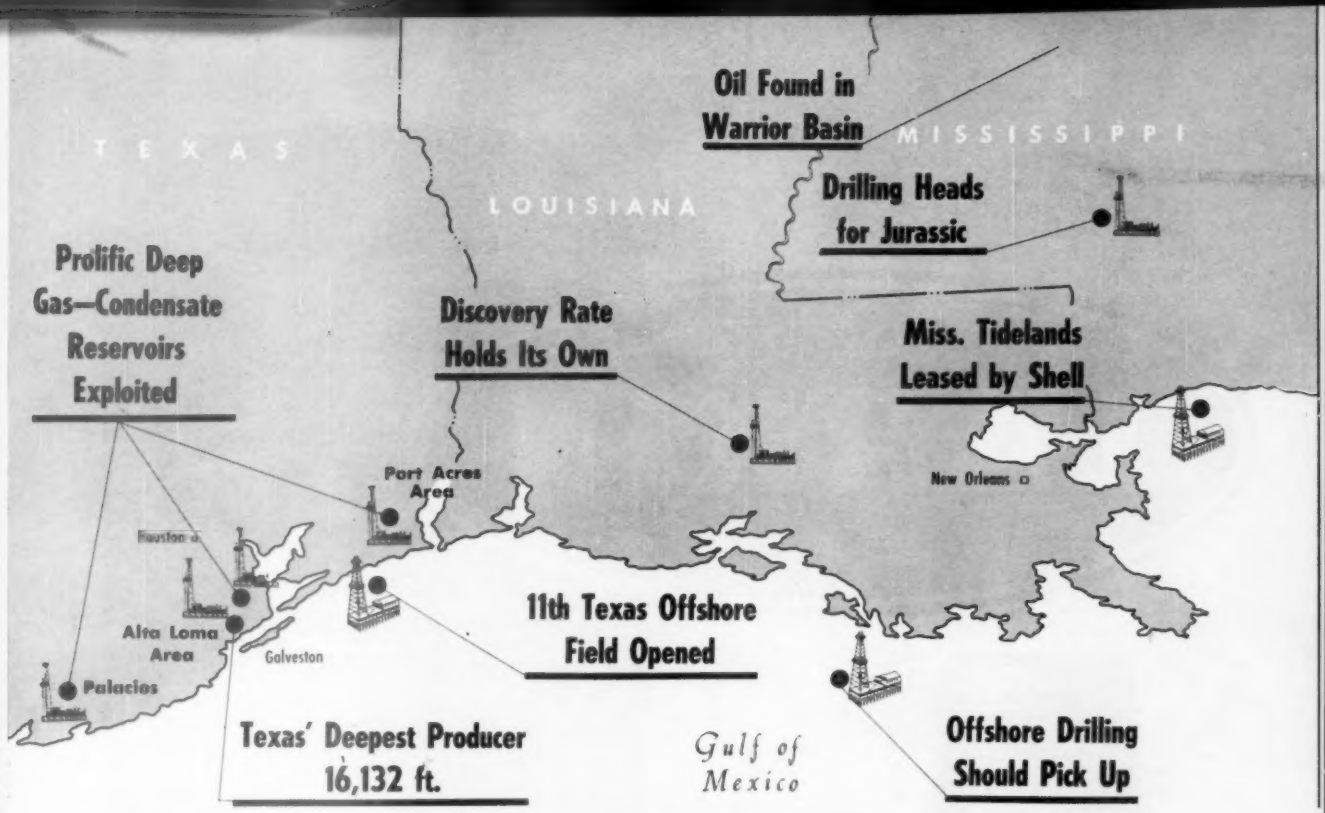

GULF COAST exploration came up with additional deep, prolific gas-condensate reserves in Southeast Texas, a new producing record for Texas, and a year of important discovery and development work in Louisiana and Mississippi.

Drilling was fine in '59

Here is a round-the-world look at 1959 oil hunting.

Gulf Coast

THE Gulf Coast Region continued in 1959 to hold a top place in exploration and development of new oil and gas production. Its multiplicity of sands, both deep and shallow, and unfathomed geological complexes enabled it to keep up a steady succession of discoveries in opening additional fields and reservoirs, and expanding previously known areas.

In the southeastern Texas portion of this region, the year saw further major spreading of production in the prolific deep Frio-Vicksburg horizons, particularly in the Port Acres-Port Arthur area of Jefferson County; the Alta Loma - Sarah White - Hitchcock area of Galveston County; and the Palacios-Collegeport area of Matagorda County.

One new discovery well drilled for Pure Oil Co. in the blooming Sarah White area (rated the most significant find of 1958) set a new producing-depth record for Texas with completion as a good gas-condensate well in sand at 16,132-16,264 ft. It is set up as the discovery of South Hitchcock field.

One additional field was found in the Gulf of Mexico off the Texas coast although new exploration there was at a virtual standstill most of the year.

Nearly 40 new fields were found in Louisiana's coastal district during the year despite the area's already high density of fields found in successive and widespread waves of exploration extending over many years.

South Mississippi's deep drilling play was enlivened late in the year by the discovery by J. Willis Hughes and Sun Oil Co. of what appears to be another important Tuscaloosa field, located at McComb, in Pike County. Early development seems to be following the pattern set by Little Creek field, less than 9 miles northeast, where more than 150 wells have been drilled within the past 2 years in one of the states most active drilling development programs.

The year in South Mississippi also was marked by spreading exploration to Lower Cretaceous and Jurassic horizons, resulting in the discovery of the state's second Cotton Valley (Jurassic) field.

Interest in the slumbering Black Warrior basin was being awakened at the close of the year by an oil discovery in Monroe County, in the northeastern portion of the state. It is the first oil production in any of the basin's Mississippian sands, previously productive only of gas.

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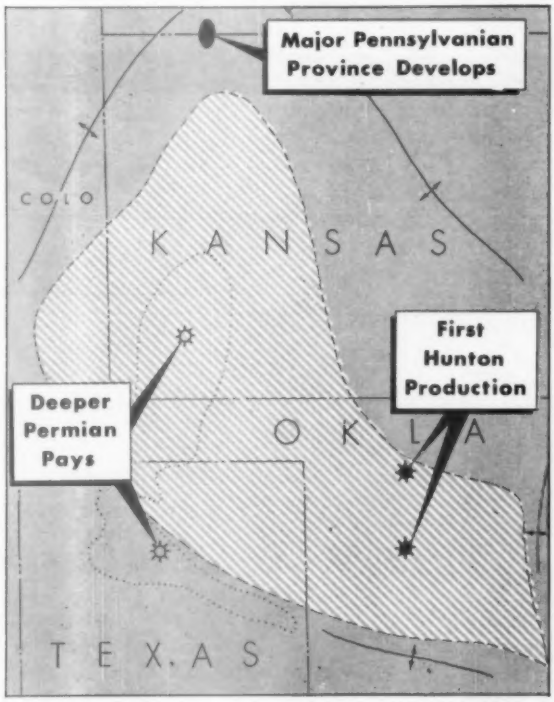
ARKANSAS-LOUISIANA-TEXAS oil hunting uncovered first Cotton Valley oil in Texas, a wave of gas-condensate exploiting in East Texas, and the birth of a future new gas giant in the Arkoma basin.

Arkoma

THE OKLAHOMA PORTION of the two-state Arkoma basin embarked on an important exploratory cycle in 1959. New gas discoveries at the western end of this basin weren't large in numbers but big in significance for the future. This basin should take its place soon among the gas provinces of the nation.

The year's most important events in this section were Republic Natural Gas Co. et al. 1 Davenport south of Kinta field in Haskell County, the 1 Pixler inside Northeast Kinta field, Midwest Oil Co. 1 Orr, a deep, prolific gas producer (17,500 M.c.f.d.), Sinclair Oil & Gas Co. 1 Reneau in Latimer County (a Viola Ordovician hit), and Carter Oil Co. 1 Morris in western Pittsburg County. All of the production was from Pennsylvanian basal sands except the Latimer County well. Arkoma is the Mid-Continent's most promising new source of gas. Drilling has been slow and tedious in years past, but is now on the move. It is one of three last wildcat barriers in Oklahoma, and it will fall to the drill soon.

In the northwestern Arkansas portion of the basin, at least nine additional gas fields were found during the year. One, at Quitman, in Cleburne County, is more than 30 miles east of the previous most easterly field. Another, at Yell, in Delaware County, is more than 15 miles south of the nearest field on the east end of the play.



ANADARKO BASIN had its biggest year with Permian, Pennsylvanian, Siluro-Devonian, and Mississippian rocks getting a thorough goingover.

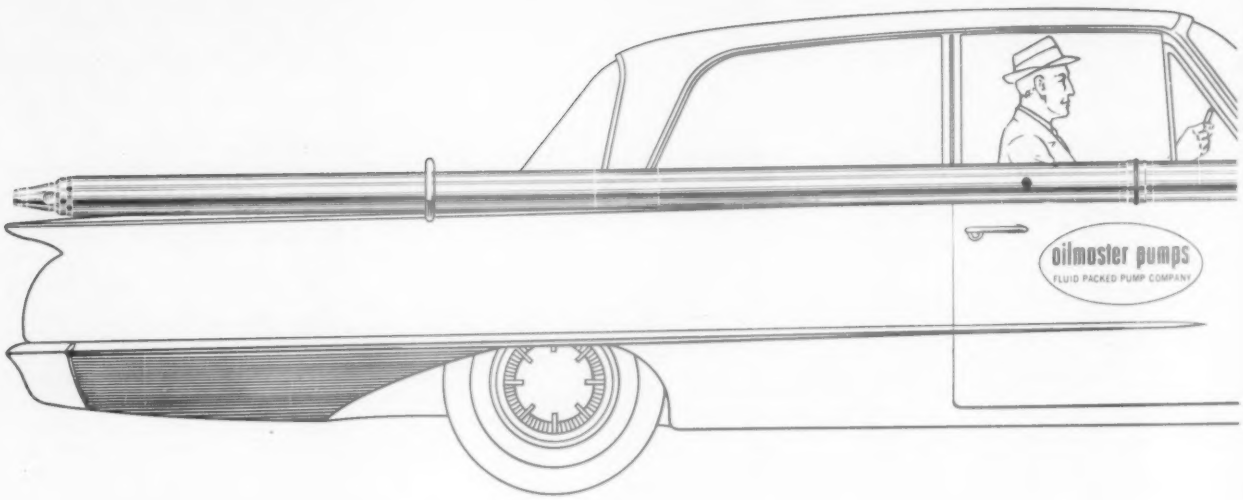
Panhandle

THE ANADARKO basin and its environs took another big forward step in exploration last year with the most important wildcat events since the earlier days of Pennsylvanian gas and oil exploitation. Except in northwestern Kansas, the Pennsylvanian grandeur faded a bit, stepping aside for a newcomer to Anadarko circles . . . the Hunton Siluro-Devonian.

Early in the year Mobil Oil Co. opened the first major production from Hunton in the basin. A few weeks before the Mobil hit, Hunton production was established in the basin at a smaller well in Major County. The Mobil well also opened first Hunton production at the below-14,000-ft. depths, first production for Custer County, and fired a busy campaign throughout western Oklahoma. Last fall Hunton production moved into busy Dewey County to the North. Mobil 1 Herring apparently is a major 5-mile extension to the Custer County find.

. . . Deeper Permian pays. Last year's Texas Panhandle and Southwest Kansas wildcatters turned up two new Permian pays below the regular Hugoton field zone—the Council Grove in Kansas, the Red Cave in Texas. Neither had produced in the region except for scattered Council Grove gas in Beaver County, Oklahoma Panhandle. Several important fields were tapped during the year as the Panhandle region's multipay producing area continues to grow year by year.

. . . The Pennsylvanian. The big story here was the rapid growth of the new Kan-Neb basin in northwestern Kansas and southwestern Nebraska. Pennsylvanian production was opened



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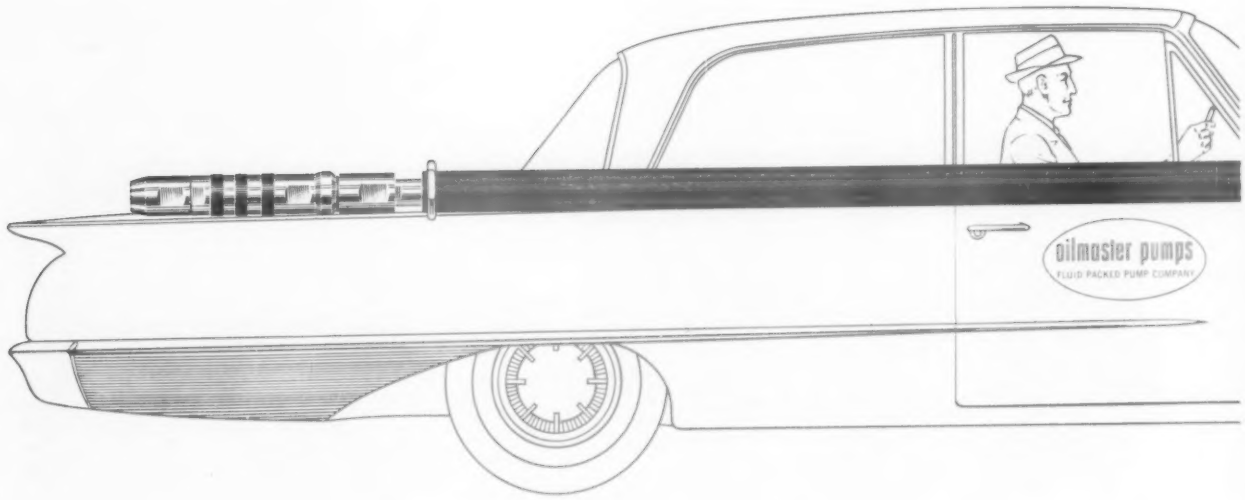

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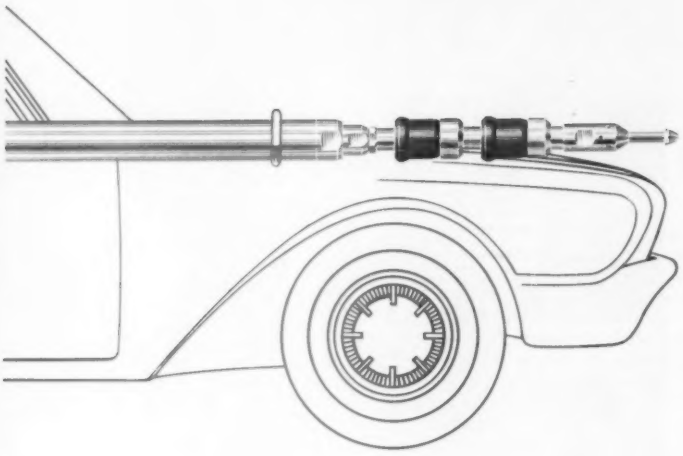

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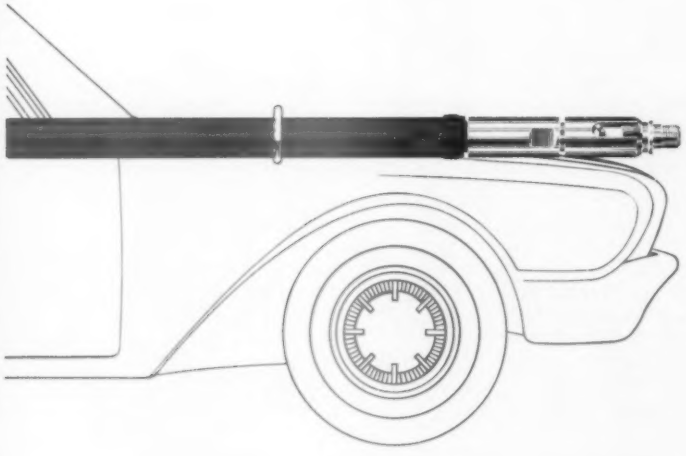

You're right, it's this one! It's the same Fluid Packed Pump Co. field service car, but on this trip it is carrying an OILMASTER Sucker Rod Pump—The pump that has set the standard by which other pumps are judged. If you are talking hydraulics with your OILMASTER representative, don't forget he also can help you with a complete line of rod pumps and accessories including such OILMASTER firsts as the Three Tube Fluid Packed Pump, the One-Piece Hardened and Honed Barrel, the incomparable Unit Barrel, the Independently Landed Parallel String for Dual Zone Installations, the Ratio Compound Pump, the Tungsten Carbide Seat and Ball and the Vertical Setting Pump Anchor.

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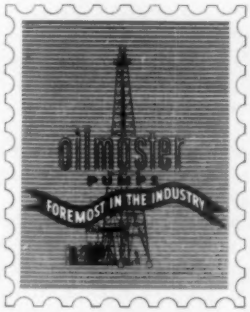

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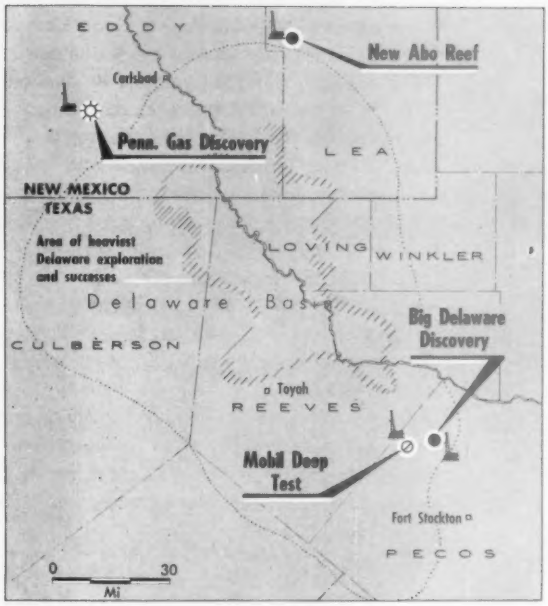


WEST TEXAS-NEW MEXICO aimed its wildcat guns to the Wolfcamp, Morrow, and Delaware sands. Delaware basin embarked on a long-awaited exploratory surge.

SOUTH TEXAS activity centered along the deep Edwards trend where first oil production was opened in this important pay at the Karnes County end.

here 2 years ago at Llanos in Sherman County, but the real play began last year. Skelly Oil Co. found two prolific pools, one in each state—Cahoj in Rawlins County, Kansas, and Reiher in Hitchcock County, Nebraska. Both were rapidly developed, setting off a flurry of exploration in the area that turned up half a dozen new fields during the year.

Texas-New Mexico

THE YEAR 1958 saw the most important drilling for West Texas and Southeast New Mexico take place within the geological limits of Delaware basin.

Here was the scene of extensive shallow exploration and development; a promising basal Permian discovery and a record-size Delaware oil strike in the deep end of the basin. Along the basin's northern limits, a deep wildcat opened the third Abo-reef field.

The deep Permian strike is Mobil Oil Co.'s wildcat in Pecos County, West Texas. While being drilled with gas at 10,890 ft., the well started flowing Wolfcamp oil. Subsequent drill-stem tests over the next 4,000 ft., still in the Wolfcamp, all recovered oil or gas.

Shaded area on the accompanying map of the basin is where numerous operators, big and small, had the most success in the shallow Delaware sands—those were pay depths ranged from 1,100-2,700 ft. Good returns at these depths spurred rapid development of every strike.

Northwest of Fort Stockton, Aro Oil Co. opened Coyanosa field with a 500-bbl. Delaware discovery. In this end of the basin operators have to drill twice as far to reach the Delaware sands, but the Coyanosa opener had nearly twice the initial potential of similar strikes in the shallower areas.

Opening of a third Abo-reef field along the basin's northern limits in New Mexico should stimulate further exploration all along this old producing trend. The Abo pay is a barrier-type reef of Leonard (Permian) age, and extends across southeastern New Mexico at relatively shallow depths.

The two fields having Abo production are Empire in Eddy County and Lovington in Lea County, New Mexico. Estimated reserves in the Abo in these fields range from 10,000 to 25,000 bbl. per acre.

Latest Abo prospect was near completion stage at year's end. Location is just south of production in Maljamar field of Lea County. The well had a series of flowing drill-stem tests over a 363-ft. Abo-reef section.

Pennsylvanian gas was found to the west and southwest of Eddy County's regular producing fields.

Exploration out of the regular producing areas of Eddy County opened Pennsylvanian gas southwest of Carlsbad and south of Artesia. More deep drilling is expected in these shelf-shore areas over the coming year.

South Texas

CHIEF among the more significant developments in South Texas during the year possibly was the finding of the first oil production on the Deep Edwards trend and the extension of the trend of fields more than 15 miles northeastward in Karnes County. The discovery (Persons field) by Brazos Oil & Gas Co. on a trend play that previously has produced gas and condensate, has been followed by another oil discovery, located off the northeast end of Fashing field, also in Karnes County. Fashing, straddling the Atascosa-Karnes County line, is the most extensively developed of the Deep Edwards gas-condensate fields, and until the Brazos discovery at Persons, was the most northeasterly production on the trend.

Wildcatting along the more inland deep Wilcox trend extending southwestward through Webb, Zapata, and Jim Hogg counties to the steadily expanding Lopena area near the Mexican border resulted in a succession of important-appearing gas-condensate discoveries. Of special note was a new deep Wilcox field opened by Atlantic Refining Co. in the northeast corner of Zapata County just south of the Webb County line, and another found almost simultaneously by Austral Oil Co. only a few miles east in the northeast corner of Jim Hogg County.

Recently found Wilcox gas production on the huge Pescadito salt dome,

NEW WELDED DERRICK

DESIGNED FOR DRILLING FROM A FLOATING VESSEL

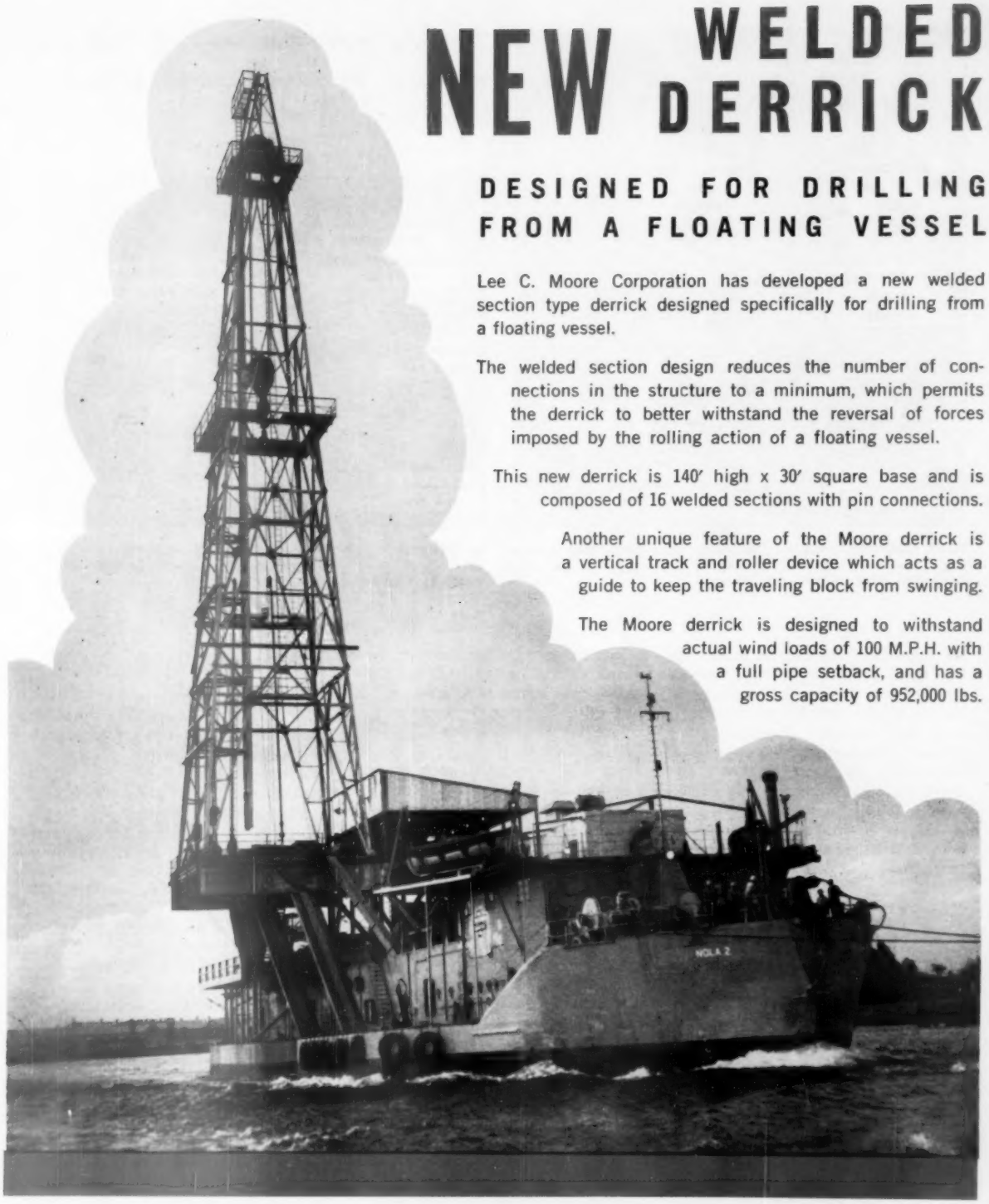
Lee C. Moore Corporation has developed a new welded section type derrick designed specifically for drilling from a floating vessel.

The welded section design reduces the number of connections in the structure to a minimum, which permits the derrick to better withstand the reversal of forces imposed by the rolling action of a floating vessel.

This new derrick is 140′ high x 30′ square base and is composed of 16 welded sections with pin connections.

Another unique feature of the Moore derrick is a vertical track and roller device which acts as a guide to keep the traveling block from swinging.

The Moore derrick is designed to withstand actual wind loads of 100 M.P.H. with a full pipe setback, and has a gross capacity of 952,000 lbs.



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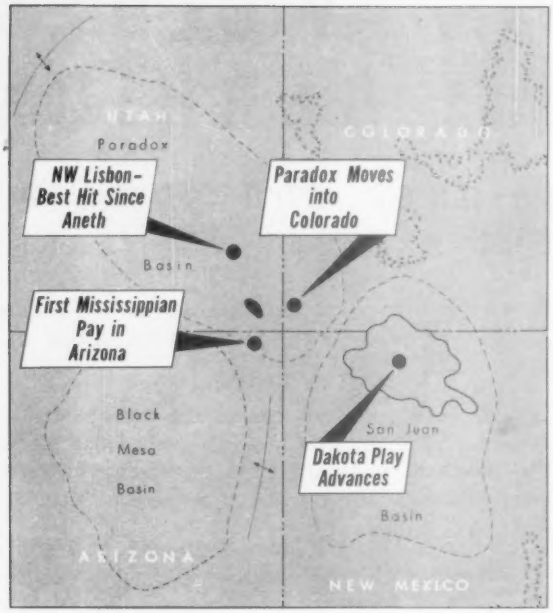
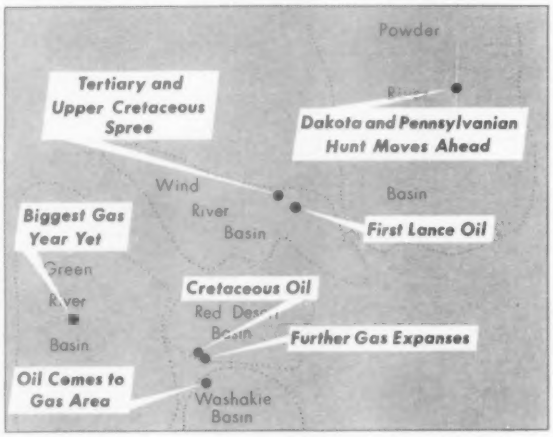
"The big exploration story of 1959 was written in Utah and Colorado's Paradox basin."



FOUR CORNERS snagged the year's most important discovery anywhere with the finding of Mississippian gas and Devonian oil at Northwest Lisbon.



WYOMING led the Rockies in 1959 exploratory success. This wildcat arena will continue to be a pace-setter in this year's oil hunting.

far removed from nearest other Wilcox field, in Webb County, was extended more than 4 miles south in that dome's third successful completion.

A fair-sized play developed along a trend extending across northern Goliad County into southern DeWitt and northern Victoria counties in exploitation of relatively shallow Frio sands. A series of gas discoveries were made both in new areas and in and around older fields productive from deeper sands.

Four Corners

THE BIG exploration story of 1959 was written in Utah and Colorado's Paradox basin. Two wildcats 15 miles from each other, both drilled by Pure Oil Co., both with Mississippian gas production opened new wildcat frontiers for the Southwest Rockies.

Pure's Northwest Lisbon wildcat in San Juan County, Utah, flowed gas from the Mississippian and oil from the Devonian. This well gave Utah its second Mississippian producer, and the third for the basin. By finding Devonian oil in the well, Pure gave this entire region a new pay to shoot at. Pure's Southeast Lisbon wildcat in San Miguel County, Colorado, gave Colorado its first Mississippian production, opened a previously nonproductive area, and gave the basin its fourth Mississippian well.

. . . General Four Corners. The Mississippian news in the Paradox basin wasn't all confined to Utah and Colorado. Last summer Arizona got its first Mississippian producer and its second oil well all in one bag. Texas Pacific Coal & Oil Co. 1 Navajo Tract 138, Apache County, pumped 240 bbl. of oil per day to give the Mississippian a southern anchor in the basin. It now appears that the Mississippian will be a prime objective in Paradox drilling for the next round of exploration in Four Corners. But the Pennsylvanian rocks didn't lack in exploratory news last year, either. This main pay of the Paradox basin moved over into Colorado's Montezuma County early last year with prolific strikes at Towaoc and Flodine Park. Several other pools were added later in the year.

San Juan basin . . . Northwestern New Mexico drillers are looking to Dakota Cretaceous rocks as their new hope for boosted oil and gas reserves.

After years of digging into other Cretaceous sands, such as Gallup, Mesaverde, and others, San Juan basin is entering a Dakota period. This Dakota trend began over 1 year ago. Its success has been phenomenal. First success was in gas production, but now the trend is to oil. More than three dozen Dakota oil and gas strikes were finaled in the basin last year. The play isn't confined to any one locale, but rather is widespread throughout the entire Blanco gas-field region.

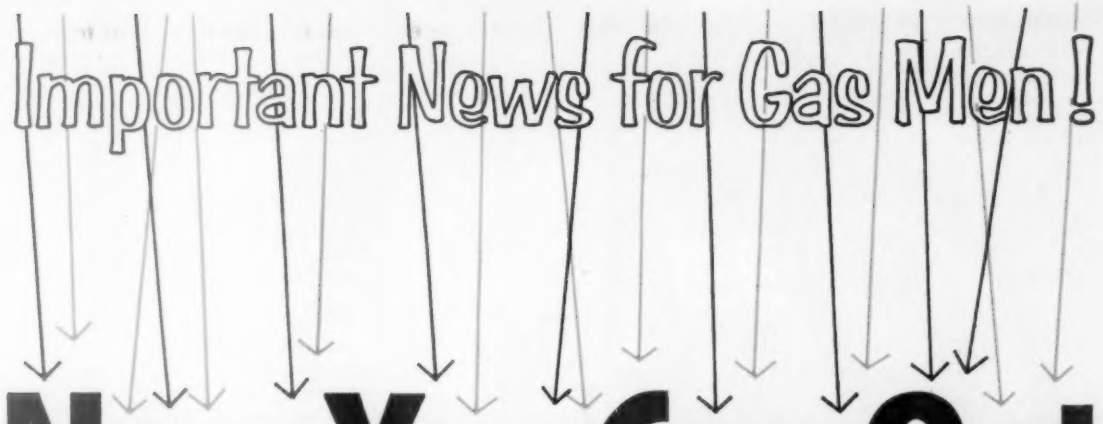
Wyoming

WYOMING, the state of many basins, was the major exploratory arena in the Rockies. Last year's wildcat trek was into the Green River, Wind River, and Powder River basins. This year's campaign will feature the same areas.

Green River basin is at the height of its wildcat career. Gas has always been the big target here, but oil is now on the scene. A major new source of oil for the basin appears to be the Almond Mesaverde Cretaceous sand. Bright new oil finds in this zone were West Desert Springs and Patrick Draw. Gas exploration netted new reserves throughout the basin.

Wind River basin, sidetracked by explorers in recent years, is back in wildcat prominence. Recent Tertiary and Upper Cretaceous strikes in the northern part of the complex basin put Wind River in a lofty exploratory position for the future. The year's big finds here were first Lance Upper Cretaceous oil for the Rockies at Waltman Unit, new discoveries in and around the Lysite and Lost Cabin areas, and gas finds at Cooper Reservoir.

Drilling in Powder River basin was at its highest clip since the Weston County boom days. The basin tagged several important new Mesaverde Cretaceous and Minnelusa Pennsylvanian oil fields. These two horizons will get an even more thorough goingover this year.



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WILLISTON BASIN success centered at three remote wildcats—one in Sheridan County, Montana, one in Dunn County, North Dakota, and the other in McKenzie County.

"There is still plenty of room to drill in every basin in the country."

Williston

WILLISTON BASIN'S major exploratory success all came in late fall with three significant hits that will have much bearing on future basin exploration.

This still relatively unexplored basin spent the early part of the year in comparative drilling silence. There was the usual drilling to Mississippian along the Nesson anticline and in Burke and Bottineau counties on the northeast side. But the real wildcat news came late.

In northeastern Montana Mobil Producing Co. tapped an important Mission Canyon Mississippian reservoir 35 miles southeast of nearest production at Outlook field. Mobil recovered oil in both Mission Canyon and Bakken at this Sheridan County wildcat. North Dakota followed with two discoveries of note. In Dunn County, Amerada Petroleum Corp. finished 1 Signalness Unit to open first production in the county. The discovery well of Lost Bridge field flowed 313 bbl. per day from Duperow-Devonian, a rare Williston pay. The importance of this wildcat is its distance south of regular Nesson anticline production. The third discovery for the basin was in McKenzie County's Medora area, a previously undrilled area. This Badlands wildcat, Shell Oil Co. and Northern Pacific Railway Co. 32-15 NP, found oil in the Mission Canyon, Midale, and Fryburg, all Mississippian pays.

These discoveries point up an important factor in exploration—there is still plenty of room to drill in every basin in the country. Two of these discoveries are more than 30 miles from any previous oil, while one stretches a prolific oil-producing anticline even farther south. Remote wildcatting in Williston has been slow in starting since Beaver Lodge, but these three strikes should rekindle the interest.

... South Dakota. As predicted in this issue just 1 year ago, South Dakota had its busiest year yet. Not since Buffalo field was opened several years ago has this part of Williston been so active. There are 15 new oil wells in and around Buffalo field as a result of a concentrated development and wildcat campaign in 1959. All production is from Red River-Ordovician. There appears to be no end in sight for this spirited localized program. In fact, we should see some long stepout drilling this year in northwestern South Dakota.

GREAT LAKES-EASTERN areas had their biggest year yet as the search for Trenton oil in Michigan and Ontario sped on, and both shallow and deep gas-hunting surged in the Appalachians.

Eastern

THE RESURGE of exploratory and development enthusiasm that began sweeping through the East 2 years ago continued with even more determination. Growth of Michigan's major new source of oil, the Trenton Ordovician, the spread of deeper drilling throughout the Appalachian province, and the brisk drilling year in Lake Erie and along the northern shore set the ball rolling for even bigger things to come.

... The Trenton. One of the oldest producing horizons in the business is the Trenton Ordovician, but it wasn't until 3 years ago that its true worth began to unfold. Now the formation is the hottest thing in the East with Michigan's Scipio trend growing steadily, oil and gas production being tapped at record rates on the shores

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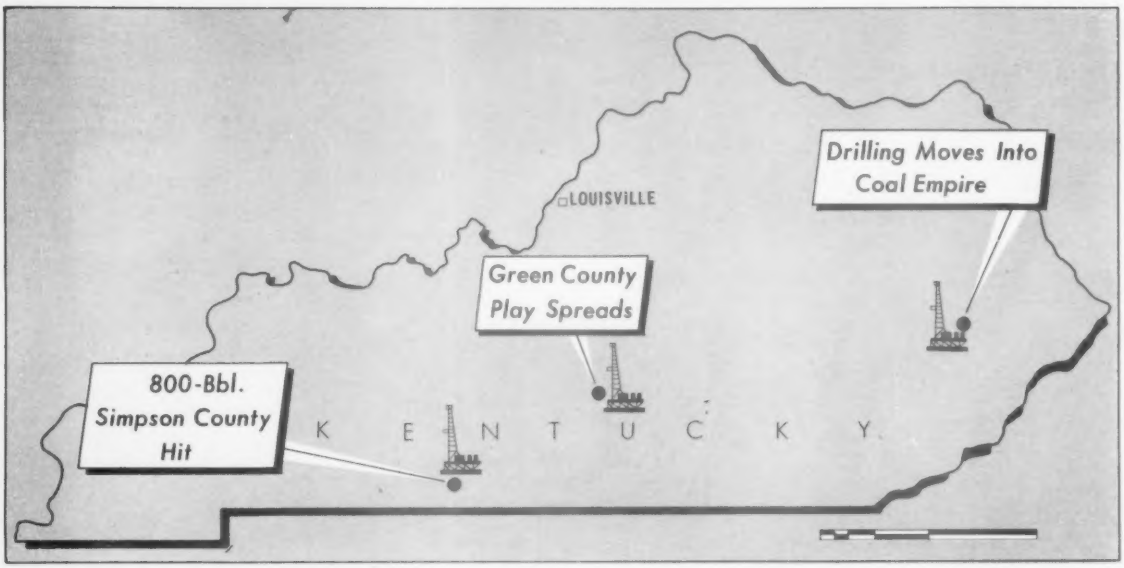

KENTUCKY'S shallow oil boom continued strong most of the year, fanning out into 14 counties in southern part of the state.

of Lake Erie and in the water itself, and plans for the future indicate a major exploitation of this section from Manitoulin Island down the escarpment and along the north shores of the southern Great Lakes. Big Trenton events of 1959 included Pulaski, Albion, and Blair in Michigan's Scipio trend, first Trenton oil in Lake Erie, and the speedup in gas exploration in Ontario.

. . . Ohio busy. This was Ohio's biggest drilling year. Exploration and development spread through all sections of the Buckeye State with tremendous success. Success ratios were among the nation's highest. The deep Ashtabula play in northeastern Ohio continued to fan out, even into Erie County, Pennsylvania.

. . . Appalachian. Deep gas, shallow gas, and depth records climaxed another active drilling year in West Virginia, New York, and Pennsylvania. Focal points of the West Virginia success are Glady and Paint Creek fields, one shallow, the other deep. Glady produces from Oriskany-Devonian at 5,000-6,000 ft.; Paint Creek pays in the shallow Weir sand. Nearly 100 deep wells were put down into Middle Devonian or older rocks in Pennsylvania last year. Rockton field is the most active area, followed by Tract 65, and Boone Mountain.

One of the year's most interesting wildcat stories was in Brown County, western Illinois. Here, some 125 miles north of St. Louis, Charles Eager 1 Davis flowed 1,005 bbl. of oil from 8 in. of Silurian lime between 634 and 635 ft., total depth. This shallow reservoir set off a wave of leasing and drilling in the immediate area. There were some dry holes finished at the end of the year and one small producer, but the play should keep busy until someone proves the potential of the northwestern rim of the Illinois basin.

Kentucky

KENTUCKY'S shallow oil play failed to simmer down any during the year. Exploration spread from Green County to some 14 surrounding areas. New fields were opened, old fields revived, and a general upsurge of development was noted. The growth of Greensburg pool itself moved northeast into Taylor County.

One of the biggest single strikes in Kentucky's shallow boom was in Simpson County near the Tennessee line. Linehan & Stoltenberg-Amtexas Oil Corp. 1 Slate flowed 792 bbl. of oil daily from just above total depth of 497 ft. in the Silurian. This new field has stirred hopes of bringing northern Tennessee back into the oil scene after many years of absence. Near the end of the year big leasing deals were reported all along the Tennessee-Kentucky border.

There were more than 2,200 wells producing in the shallow Kentucky area, making up to 729,703 bbl. per month at the first of November. Counties involved were Green, Taylor, Metcalfe, Cumberland, Hardin, Hart, and Russell.

Alaska-Arctic

ANOTHER YEAR of outstanding and far-reaching discoveries highlighted 1959 north of the border and in the new state of Alaska. The wildcat drill pushed to the Arctic Circle and beyond during the year with notable success. The newsmakers in western Canada and Alaska included first production for Yukon Territory, first gas production for Alaska, continued development of Swanson River on the Kenai Peninsula, the revelation of the huge oil reserves at Umiat on the Barrow tundra, the upsurge of gas and oil hunting in British Columbia, the fanning out of Swan Hills' importance as one of the continent's big oil reserves, and the southward movement of big gas production along the Alberta foothills belt.

The Arctic . . . Yukon's first commercial production was established at Western Minerals 1 Chance, 150 miles northeast of Whitehorse in the Permo-Pennsylvanian. This well is as important to exploration in the Arctic as Aneth was to the Paradox basin several years ago. The Chance well is the first oil find in Canada's far north country since Norman Wells, 300 miles southeast in 1920. Chance has already stirred an active planning board for exploration up to and beyond the Arctic Circle. Arctic Islands were leased last year for future exploration, Scurry-Rainbow will drill the first well inside the circle at Grandview Hills in McKenzieland.

In Alaska . . . Union-Ohio found first gas production in Alaska on the Kenai Peninsula's Kenai unit. This discovery caused a stir in our new state because of the need for gas in the state's economy. The Swanson River oil field, the state's only currently pro-

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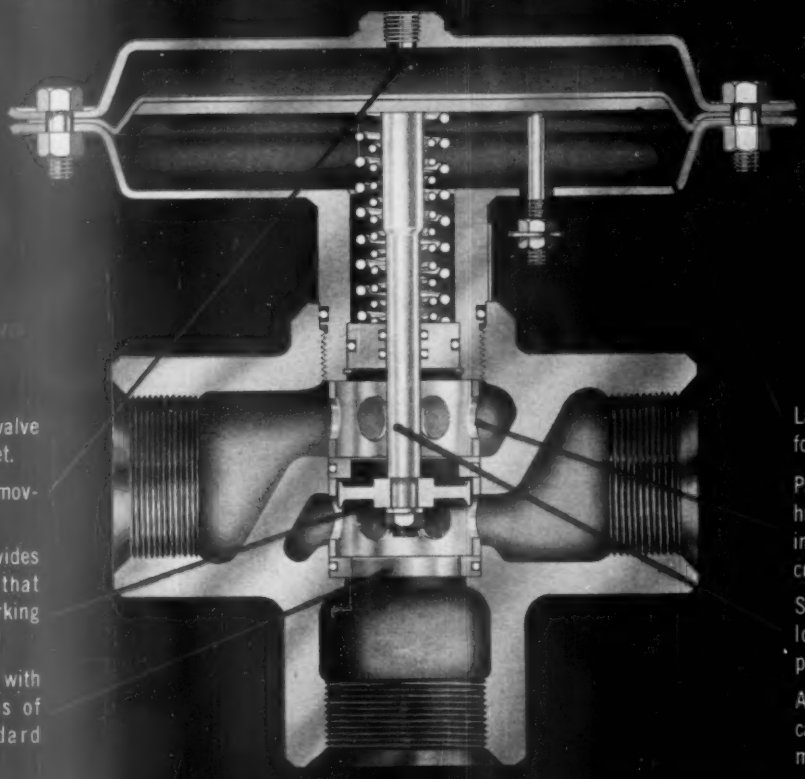

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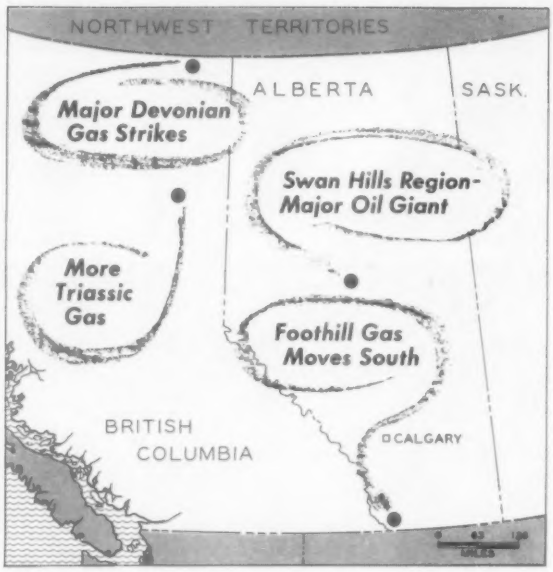
"For the last 10 years, California's most reliable source of new reserves has been deeper drilling in and around developed oil fields."



SWAN HILLS remained the big story in western Canada with the discovery of Judy Creek, Sarah Lake adding to the growing Middle Devonian oil reserves of the country.

ducing area, got its fifth well late in the year. Other exploration met with dry holes but the hunt was brisk and should be more so this year.

In Canada . . . The opening of further Middle Devonian oil reserves in the Swan Hills region at Judy Creek, Sarah Lake, and others was the wildcat event of the year once again in Alberta. This field is now recognized as the best find in Canada since Leduc itself.

Middle Devonian rocks also played a major role in British Columbia exploration as wildcatters opened huge gas reserves at Kotcho Lake and Petitot River. Triassic gas development also continued strong.

Southwestern Alberta's Waterton Park area is still adding gas reserves to make it one of Canada's biggest coffers. Lookout Butte and more extensions to Waterton Park itself made the year's headlines.

California

IN EXPLORATION, history repeated itself in California in 1959.

For the last 10 years, the state's most reliable source of new reserves has been deeper drilling in and around developed oil fields. Although not as glamorous as remote wildcatting perhaps, it has been productive.

Sharing the role of top new oil source with deeper drilling has been town-lot drilling in the Los Angeles Basin. Between the two, they've pretty well divided discovery honors for 1959. Here's the picture:

Deeper drilling, known fields . . . This activity turned up two significant finds in 1959 in addition to a number of smaller discoveries. The two big ones were:

. . . San Emidio Nose. Richfield Oil Corp. made news with a Stevens sand deeper pool discovery in this year-old field. Previous production had been exclusively from the Reef Ridge sand around 11,500 ft. The Stevens discovery was made in perforations at 12,702-12,838 ft. The discovery well was completed in both zones last March. Initial production from both ran around 500 bbl. daily. This Kern County field was one of the top discoveries of 1958.

. . . Bridge Pool, South Mountain. This unique activity, where operators drill through older formations to get to younger formations along an overturned fault, maintained its record of turning up big new pools. Union Oil Co. of California moved on a location south of the nearest Bridge Pool producer to score a big new-pool discovery last January. An upper zone around 8,700-9,400 ft. is in the Pliocene-West pool while the deeper zone at 9,600-10,780 ft. was in a new pool officially labeled the Hill pool.

ALASKAN-ARCTIC exploration sired a new era for drilling in the Far North. First activity north of the Arctic Circle is now under way.

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provides a clean, safe "working surface"—removes cement sheath, scale and burrs.

The brittle cement sheath, *indicated in blue*, always remains after the drill bit has passed, and can prevent slips of pack-off tools from gripping properly. Or trapped between the casing and packing element, this cement sheath can crack under compression and cause pressure-leaks. Expensive failures of other tools also can be traced to obstructions, such as, *embedded bullets, perforation burrs, rust, mill scale, paraffin, and the like.*

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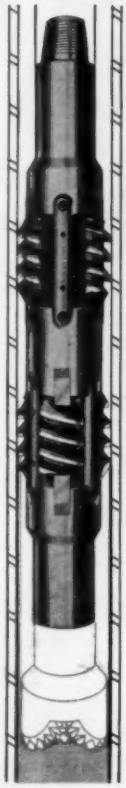

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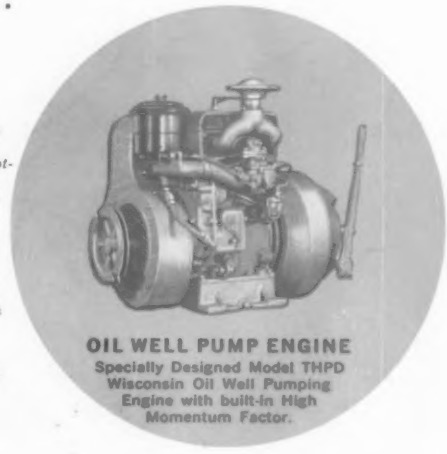

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CALIFORNIA exploration featured movie-lot successes, a sharp upswing in gas searching in the Sacramento Valley, and the promise of more offshore oil finds.

Initial production from the Hill was around 700 bbl. daily.

Town-lot drilling . . . Probably the state's most significant discovery of 1959 went to this category in the Continental Oil Co. wildcat on the Metro-Goldwyn-Mayer studio in Culver City, a Los Angeles suburb. The Continental well was credited with being a new field discovery when it came in for more than 700 bbl. from a zone unrelated to any in the surrounding oil fields. Information was scanty on this tight-hole wildcat, but the operator was wasting no time in defining the field further with wells being drilled from a soundproofed site on the movie lot.

Gas drilling . . . Favorable economics pushed wildcatting in Central and North California's natural-gas counties. A number of minor discoveries were made as well as significant old-field extensions successfully completed, but nothing resembling a major discovery was made.

About the only discovery worthy of the name was the one by Golden Bear Oil Co. at Garrison City in Kern County. In addition to the field discovery well, the operator turned up a couple of new pools in subsequent development drilling.

Fields showing good results in step-out and extension drilling included Vernalis in San Joaquin County, Arbuckle in Colusa County, Beehive Bend-Willows in Glenn County and gas fields in the Sacramento River Delta area.

"Africa rose to a highly respected position among leading world oil hopefuls."

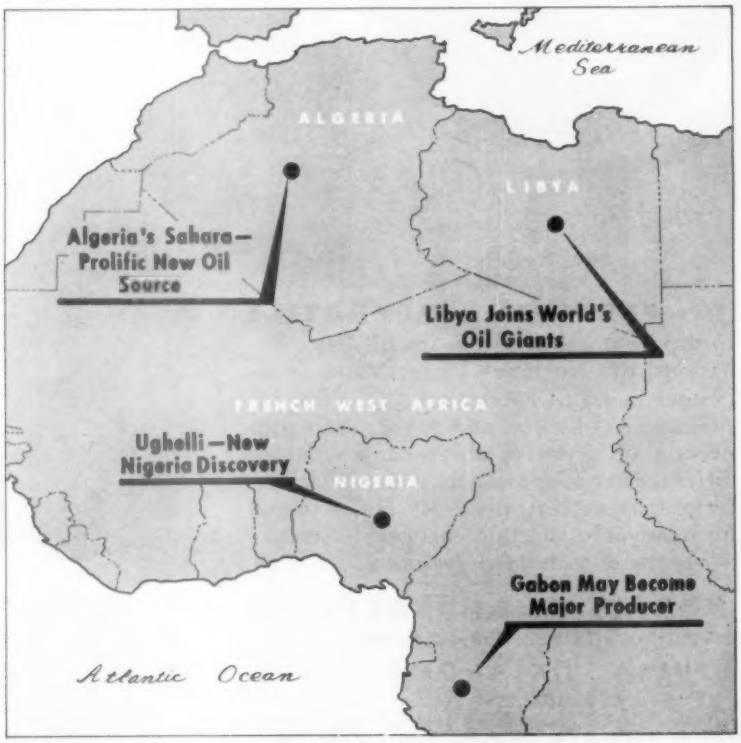
Africa

AFRICA ROSE to a highly respected position among leading world oil hopefuls with Algeria, Libya, and the French West African countries leading the way. Not since the Middle East was tapped as a major source of oil for the world has one continent leaped into the picture so fast.

In Algeria one of the most prolific fields is Edjele in the eastern part of the country. Another is at El Agreb whose discovery well flowed 2,540 bbl. per day. The field is similar in many ways to big Hassi Messaoud. El Gassi, 60 miles south of Hassi Messaoud, flowed 2,250 bbl. per day. Hassi Messaoud continues to be the busiest and fastest-growing oil reservoir in northern Africa.

As an oil-producing nation, Libya is young. But it promises to take its place among its oil neighbors. Esso Standard's Zelten 1-6 discovery tested 17,500 bbl. per day from a thick pay section of Paleocene rocks to start Libya on its way as an oil finder. Among the other 1959 finds of note are Bir Tlacsin, Dahra F1-32, Emgayet 1-66, Mobruk 1-17, and Beda 1-47.

New inland oil discoveries in Gabon and Nigeria last year will give the French Equatorial section of the continent a new lease on oil hunting. Most of Gabon's fields were previously on the coast, but now the drill is entering the interior with success.



AFRICA led foreign exploratory success as the Dark Continent emerged to world oil prominence.

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Alabama	21	19	43	50	72	103	63	41	91	78	76	95
Arkansas	301	322	407	429	427	573	665	804	1,002	1,114	836	842
California	2,876	2,512	1,829	2,361	2,433	2,578	2,353	2,465	2,306	2,238	1,476	1,530
Colorado	207	82	99	289	486	734	1,358	1,509	1,222	855	836	809
Florida	26	24	13	2	10	30	31	30	13	9	7	7
Illinois	2,438	2,711	2,823	2,424	2,149	2,165	3,135	3,892	3,808	2,686	2,419	2,357
Indiana	1,082	1,279	1,534	1,369	1,277	1,280	887	706	741	754	877	880
Kansas	3,284	3,387	4,010	4,501	4,571	4,783	4,722	4,958	4,941	4,232	4,022	3,959
Kentucky	908	1,047	1,150	1,309	1,300	1,164	1,188	1,592	1,936	1,495	2,137	3,365
Louisiana	2,325	2,371	2,453	2,240	2,385	2,828	3,611	4,019	3,875	3,856	3,523	3,781
Michigan	895	995	897	746	707	623	567	512	437	455	436	656
Mississippi	428	334	313	375	348	397	441	448	441	386	398	645
Missouri	....	....	27	18	18	10	39	1	34	8	6	2
Montana	345	279	270	262	345	451	343	411	495	433	338	348
Nebraska	62	49	171	241	291	320	472	891	918	886	728	910
New Mexico	606	501	607	773	1,053	1,418	1,126	1,663	1,904	2,129	1,910	2,077
New York	1,344	882	657	627	767	696	435	378	512	443	544	259
North Dakota	....	....	3	12	122	270	312	250	263	316	442	436
Ohio	1,393	1,084	1,027	971	1,052	1,080	1,182	1,259	1,086	1,115	1,049	1,133
Oklahoma	4,293	4,352	5,459	5,626	5,781	7,593	8,786	8,411	8,056	6,235	6,354	5,359
Pennsylvania	3,159	1,920	1,581	1,738	1,884	1,507	1,331	717	748	833	652	648
South Dakota	(*)	(*)	12	1	14	20	23	16	9	44	15	23
Texas	12,251	13,665	16,585	16,555	16,845	17,019	18,865	19,981	21,519	21,352	18,065	18,526
Utah	18	49	17	39	79	70	91	92	141	267	383	318
West Virginia	846	518	652	622	606	618	614	640	693	680	756	806
Wyoming	584	587	615	745	700	917	1,221	915	930	863	762	990
Miscellaneous	86	69	25	91	99	32	69	81	39	76	64	132
Total U. S.	39,778	39,038	43,279	44,516	45,821	49,279	53,930	56,682	58,160	53,838	49,111	50,893

*Included in miscellaneous.

. . . with wildcats accounting for 485

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Alabama	19	14	20	21	40	75	56	40	30	28	30	23
Arkansas	97	78	100	99	97	140	157	210	190	25	163	146
California	492	487	450	551	597	666	572	530	527	527	368	402
Colorado	46	48	56	143	245	364	657	811	675	550	485	456
Florida	23	19	10	2	10	30	30	29	13	9	7	7
Illinois	622	724	870	873	656	425	461	635	772	628	449	391
Indiana	327	471	510	559	424	373	224	261	145	155	307	300
Kansas	510	522	816	1,006	845	887	811	1,018	1,073	849	844	1,066
Kentucky	139	169	214	293	306	213	173	399	440	310	176	389
Louisiana	310	281	302	379	401	513	570	695	778	679	531	513
North	119	106	136	210	195	177	214	242	265	211	243	244
South	191	175	166	169	206	336	356	453	513	468	288	269
Michigan	313	344	338	332	277	279	243	212	168	152	145	180
Mississippi	108	115	130	174	182	207	178	182	220	194	174	283
Montana	30	45	49	50	98	126	123	172	195	185	136	121
Nebraska	30	18	82	134	168	161	185	415	451	474	348	410
New Mexico	71	74	79	105	165	168	156	158	278	267	266	260
North Dakota	....	....	3	12	36	91	117	69	78	149	135	84
Ohio	52	37	19	35	41	22	22	27	13	15	23	39
Oklahoma	831	804	840	830	730	742	859	832	867	747	854	827
Pennsylvania	24	6	4	10	20	20	46	16	19	18	26	21
South Dakota	(*)	(*)	12	1	14	20	22	16	9	44	15	10
Texas	2,568	2,791	3,443	4,408	4,851	5,245	5,190	5,124	5,610	5,004	3,636	3,525
N. Central (9)	429	475	607	862	1,048	1,058	1,131	975	1,115	1,089	573	573
W. Central (7-B)	469	592	729	1,019	1,035	1,062	971	1,035	1,075	973	699	694
West (7-C and 8)	314	343	669	844	870	876	938	839	898	872	706	747
Panhandle (10)	15	19	24	36	80	26	94	65	125	113	126	108
East (5 and 6)	142	186	223	255	252	300	334	367	431	387	332	252
Gulf Coast (2)	500	450	480	299	336	369	312	344	308	255	196	232
Gulf Coast (3)	79	81	83	363	390	519	526	517	562	440	286	234
Southwest (1)	80	95	98	249	348	432	385	481	498	431	367	329
Southwest (4)	540	550	530	481	492	603	499	501	598	444	351	356
Utah	18	19	13	32	50	42	65	71	86	121	84	101
West Virginia	82	24	43	17	14	23	51	30	27	33	22	29
Wyoming	104	131	122	141	173	189	271	262	289	310	259	375
Miscellaneous	61	73	29	95	112	41	41	57	81	266	105	115
Total U. S.	6,877	7,294	8,554	10,302	10,552	11,062	11,280	12,271	13,034	11,739	9,588	10,073

*Included in miscellaneous.

Footage gains 5.5% over 1959's figure

(Thousands of feet)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Arkansas	1,270	1,283	1,342	1,522	1,589	2,111	2,400	2,629	3,005	3,389	2,787	2,865
California	10,579	10,443	7,966	9,566	10,313	11,355	10,923	12,724	10,566	9,786	7,178	7,343
Colorado	1,228	359	409	1,425	2,580	3,830	7,412	8,103	6,232	4,477	4,352	4,235
Illinois	6,386	6,362	6,311	6,044	5,312	5,425	7,613	9,303	8,771	6,198	5,494	5,136
Indiana	2,023	2,357	2,642	2,455	2,255	2,102	1,380	1,103	1,243	1,301	1,406	1,320
Kansas	10,634	10,715	12,744	15,035	15,520	16,217	16,328	17,597	17,103	15,272	14,065	14,160
Kentucky	1,515	1,853	2,076	2,412	2,568	2,355	2,284	2,372	2,748	2,167	2,385	3,520
Louisiana	10,934	12,477	14,554	14,189	15,662	19,125	21,987	26,085	28,438	29,998	27,024	28,896
North	4,128	4,453	4,626	4,741	4,815	4,530	5,923	6,460	6,083	5,285	4,970	5,388
South	6,806	8,024	9,928	9,448	10,847	14,595	16,064	19,625	22,355	24,713	22,054	23,508
Michigan	1,983	2,209	2,118	1,860	1,808	1,603	1,542	1,522	1,262	1,316	1,202	2,004
Mississippi	3,312	2,388	2,258	2,539	2,441	2,750	3,162	3,339	3,193	2,934	3,561	6,076
Montana	819	650	621	640	1,257	1,933	1,473	1,928	2,440	2,100	1,732	1,620
New Mexico	2,602	2,419	2,747	3,777	5,833	8,017	6,161	7,046	8,458	9,980	8,869	8,684
N. Y., Pa., and W. Va.	9,293	5,835	5,381	5,800	6,512	5,662	6,691	3,993	4,439	5,026	4,841	4,558
North Dakota	.....	.....	27	65	1,002	1,962	2,246	1,774	1,977	2,157	2,840	2,787
Ohio	3,498	2,286	2,172	2,057	2,295	2,274	2,391	2,642	2,583	2,689	2,708	2,918
Oklahoma	15,515	15,339	19,865	20,542	21,621	26,122	29,463	27,532	27,821	21,595	21,013	20,296
Texas	52,746	57,462	71,975	76,777	82,451	78,645	85,185	85,984	92,620	89,840	74,885	78,142
N. Central (7-B and 9)	11,312	12,831	14,513	16,017	18,688	21,958	22,484	22,982	23,396	21,410	16,964	17,201
West (7-C and 8)	15,428	16,398	26,543	28,233	29,389	20,318	25,144	26,560	28,644	29,549	24,979	27,138
Panhandle (10)	2,053	3,015	2,804	2,307	2,123	2,555	3,211	3,720	5,202	5,639	5,762	5,563
East (5 and 6)	3,383	4,992	4,928	5,603	4,455	4,209	5,590	4,884	5,682	6,685	5,557	5,420
Gulf Coast (2 and 3)	11,995	11,880	13,706	14,328	16,968	16,361	17,245	16,034	17,452	15,846	13,170	13,020
Southwest (1 and 4)	8,575	8,346	8,481	10,289	10,828	13,244	11,511	11,804	12,224	10,711	8,453	9,800
South Dakota	(*(	(*)	30	3	48	103	108	64	48	158	48	175
Wyoming	2,501	2,803	2,994	3,789	3,529	4,337	6,537	4,484	3,966	3,848	3,599	4,899
Miscellaneous	554	763	1,056	1,834	2,594	2,911	3,700	6,046	6,989	7,669	7,395	8,616
Total U. S.	137,392	138,003	159,288	172,331	187,190	198,839	218,986	226,270	233,902	221,900	197,384	208,250

*Included in miscellaneous.

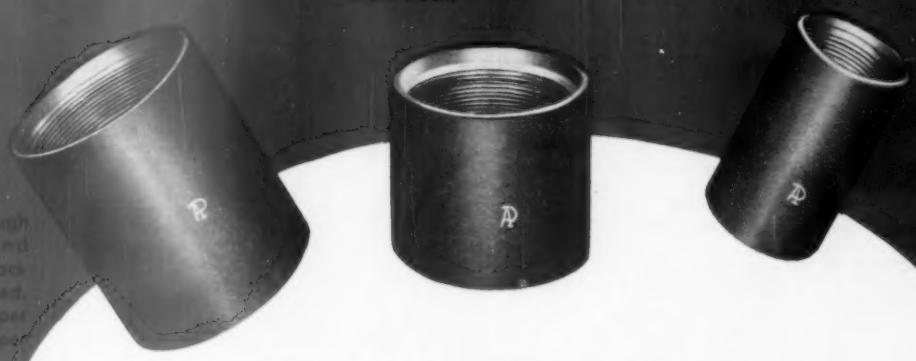
. . . with average well 73 ft. deeper

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Alabama	5,260	4,657	4,368	5,380	5,722	5,257	5,221	4,878	8,789	9,316	8,566	9,972
Arkansas	4,218	3,984	3,296	3,549	3,721	3,684	3,609	3,270	2,997	3,042	3,333	3,402
California	3,678	4,157	4,356	4,052	4,239	4,443	4,642	5,162	4,581	4,373	4,863	4,799
Colorado	5,932	4,378	4,132	4,929	5,309	5,218	5,458	5,370	5,100	5,587	5,205	5,235
Florida	5,939	7,529	5,893	10,047	6,256	6,517	6,406	6,638	6,984	6,403	9,671	8,447
Illinois	2,620	2,347	2,236	2,493	2,472	2,506	2,428	2,390	2,303	2,308	2,271	2,179
Indiana	1,870	1,843	1,722	1,793	1,766	1,642	1,556	1,563	1,678	1,725	1,603	1,497
Kansas	3,238	3,459	3,178	3,340	3,395	3,391	3,458	3,459	3,462	3,609	3,497	3,577
Kentucky	1,668	1,770	1,805	1,842	1,976	2,033	1,922	1,490	1,419	1,450	1,116	1,046
Louisiana	4,703	5,262	5,933	6,334	6,567	6,763	6,064	6,490	7,339	7,779	7,671	7,642
Michigan	2,215	2,220	2,362	2,494	2,557	2,573	2,720	2,973	2,889	2,893	2,758	3,055
Mississippi	7,738	7,150	7,214	6,771	7,013	6,926	7,170	7,453	7,241	7,602	8,946	9,420
Montana	2,375	2,328	2,301	2,443	3,643	4,287	4,295	4,691	4,930	4,851	5,125	4,656
Nebraska, Missouri	709	2,240	3,191	4,083	4,447	5,039	5,137	5,603	5,490	5,826	5,883	5,953
New Mexico	4,293	4,828	4,526	4,886	5,539	5,654	5,471	4,237	4,443	4,687	4,644	4,181
New York	1,438	1,434	1,437	1,440	1,369	1,447	1,446	1,460	1,465	1,107	1,533	1,619
North Dakota	.....	.....	9,038	5,425	8,213	7,267	7,200	7,096	7,518	6,827	6,425	6,391
Ohio	2,511	2,110	2,115	2,119	2,181	2,105	2,023	2,098	2,378	2,412	2,582	2,576
Oklahoma	3,614	3,525	3,639	3,651	3,740	3,440	3,553	3,273	3,453	3,463	3,307	3,787
Pennsylvania	1,636	1,605	1,717	1,800	1,971	1,977	3,273	2,534	2,436	3,190	3,011	3,207
Texas	4,305	4,205	4,340	4,601	4,301	4,626	4,516	4,303	4,304	4,207	4,145	4,218
Utah	4,140	5,001	4,069	5,473	6,395	5,653	4,139	4,314	4,893	5,423	5,618	5,464
West Virginia	2,592	2,873	2,643	2,844	2,887	2,710	2,776	2,505	2,694	2,751	2,704	2,557
Wyoming	4,282	4,775	4,869	5,086	5,042	4,730	5,354	4,901	4,265	4,458	4,724	4,948
Miscellaneous	1,986	1,933	3,221	3,035	2,624	2,886	2,966	3,078	4,771	4,470	3,202	3,987
Total U. S.	3,454	3,538	3,680	3,871	4,085	4,035	4,061	3,992	4,022	4,122	4,019	4,092

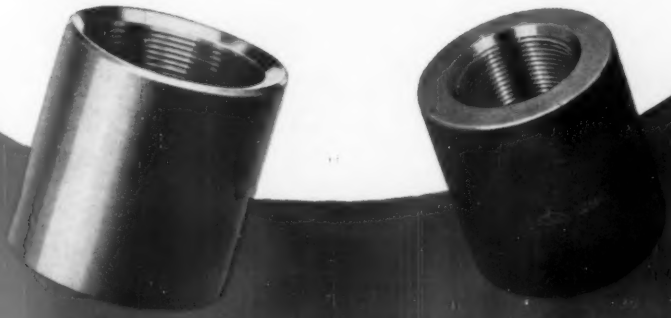
A. P. I. CASING COUPLINGS
Short and Long, sizes 4 ½" through 13 ⅜". All threads 8 round, ¾" taper topped per foot. Combination and sharp V thread casing couplings also available from stock.

A. P. I. TUBING COUPLINGS
Non-Upset sizes 1.900" through 4½". Upset sizes 1.660" through 4". Grades J-55, N-80 and P-105

A. P. I. LINE COUPLINGS
Sizes ⅛" through 12", 14" and 16" O.D. Black and Galvanized. Recessed, Taper Tapped ¾" per foot.



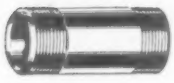
ALL SIZES AND TYPES OF
COUPLINGS
FOR THE OIL INDUSTRY



STANDARD MERCHANT
Black and galvanized. Sizes ⅛" through 6"

3000# and 6000# FORGED STEEL COUPLINGS
Manufactured to A.S.T.M. specification A-105. Available in full and half couplings. 3000# sizes ⅛" through 4". 6000# sizes ½" through 3".

USE WITH THESE DEPENDABLE CAPITOL FITTINGS

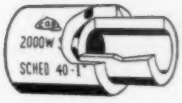


NIPPLES

UNIONS

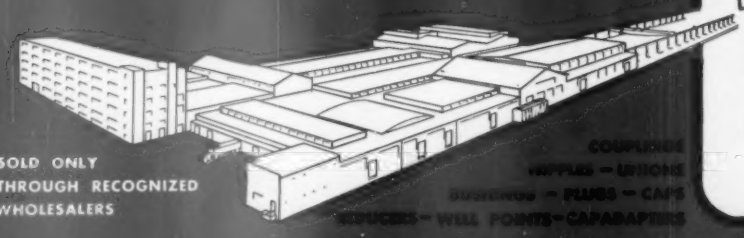
SQUARE HEAD PLUGS

HEX HEAD PLUGS



SOCKET WELD COUPLINGS AND CAPS

PRODUCERS OF QUALITY FITTINGS FOR MORE THAN 30 YEARS



SOLD ONLY THROUGH RECOGNIZED WHOLESALERS

COUPLINGS
NIPPLES — UNIONS
BUSHINGS — PLUGS — CAPS
REDUCERS — WELL POINTS — CAPADAPTERS

CAP CAPITOL
MANUFACTURING CO.
DIVISION OF HARSCO CORP.
COLUMBUS, OHIO

The Journal here presents the only published

County-by-county drilling tally

for U. S. wildcat and development wells

ALABAMA
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Baldwin	1	0	0	0	1	7,810
Choctaw	1	0	0	0	1	4,005
Clarke	2	0	0	0	2	16,094
Fayette	1	0	0	0	1	3,478
Franklin	1	0	0	0	1	1,275
Lawrence	2	0	0	0	2	2,415
Limestone	1	0	0	0	1	2,506
Marion	2	0	0	0	2	4,080
Mobile	2	0	0	0	2	24,051
Monroe	1	0	0	0	1	5,626
Sumter	1	0	0	0	1	3,910
Walker	2	0	0	0	2	4,356
Washington	4	0	0	0	4	34,340
Wilcox	1	0	0	0	1	5,042
Winston	1	0	0	0	1	2,235
Total	23	0	0	0	23	121,223

ALABAMA
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Clarke	1	1	0	0	0	0	5,517
Mobile	71	69	0	0	2	0	820,568
Total	72	70	0	0	2	0	826,085

ARIZONA
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Apache	15	1	0	1	13	52,130
Coconino	2	0	0	0	2	5,756
Mohave	1	0	0	0	1	1,151
Navajo	6	0	0	0	6	24,111
Yuma	1	0	0	0	1	2,006
Total	25	1	0	1	23	85,154

ARIZONA
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Apache	2	1	0	0	1	0	12,033
Total	2	1	0	0	1	0	12,033

ARKANSAS
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Ashley	4	0	0	0	4	16,469
Baxter	1	0	0	0	1	100
Bradley	2	0	0	0	2	6,731
Calhoun	8	2	0	0	6	26,049
Chicot	1	0	0	0	1	7,685
Clark	1	0	0	0	1	3,101
Cleburne	1	0	0	1	0	3,868
Cleveland	1	0	0	0	1	1,668
Columbia	9	0	0	0	9	56,077
Conway	2	0	0	0	2	10,295
Drew	4	0	0	0	4	22,565
Franklin	2	0	0	2	0	10,639
Hempstead	3	0	0	0	3	13,149
Howard	1	0	0	0	1	2,416
Lafayette	27	5	0	0	22	121,109
Little River	3	0	0	0	3	10,206
Logan	2	0	0	2	0	11,965
Madison	1	0	0	0	1	900
Miller	11	2	0	0	9	48,968
Nevada	4	0	0	0	4	12,324
Ouachita	10	0	0	0	10	32,519
Pike	1	0	0	0	1	596
Pope	5	0	0	2	3	21,961
Union	37	7	0	1	29	143,674
Washington	3	0	0	0	3	2,952
Yell	2	0	0	1	1	18,024
Total	146	15	0	9	122	606,010

ARKANSAS
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Bradley	20	19	0	0	0	1	61,544
Calhoun	18	10	0	0	8	0	50,706
Columbia	32	21	0	0	10	1	105,559
Conway	2	0	0	0	2	0	4,276
Crawford	2	0	0	1	1	0	11,338
Franklin	10	0	0	8	2	0	56,654
Johnson	3	0	0	3	0	0	13,686
Lafayette	108	48	0	5	55	0	481,439
Logan	2	0	0	2	0	0	13,289
Miller	60	36	0	4	20	0	249,964
Nevada	36	25	0	0	11	0	71,903
Ouachita	74	59	0	1	14	0	184,920
Pope	4	0	0	2	2	0	14,914
Sebastian	2	0	0	1	1	0	11,626
Union	323	229	0	5	86	3	926,844
Total	696	447	0	32	212	5	2,258,662

CALIFORNIA
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Butte	10	0	0	1	9	36,831
Colusa	12	0	0	1	11	71,293
Contra Costa	6	1	0	3	2	19,562
Fresno	10	0	0	0	10	80,315
Glenn	15	0	0	5	10	85,478
Imperial	2	0	0	0	2	2,070
Kern	103	17	0	5	81	699,409
Kings	13	0	0	1	12	67,384
Los Angeles	32	3	0	0	29	233,939
Madera	4	0	0	0	4	11,845
Merced	1	0	0	0	1	7,335
Monterey	9	1	0	0	8	30,610
Orange	11	1	0	0	10	63,151
Riverside	1	0	0	0	1	4,188
Sacramento	15	0	0	4	11	78,556
Santa Barbara	26	3	0	0	23	141,411
Santa Cruz	2	0	0	0	2	2,242
San Benito	7	0	0	0	7	27,281
San Bernardino	6	0	0	0	6	25,441
San Joaquin	20	0	0	3	17	110,286
San Luis Obispo	19	0	0	0	19	30,764
San Mateo	5	1	0	0	4	17,940
Solano	13	0	0	2	11	76,774
Sonoma	2	0	0	0	2	6,723
Stanislaus	7	0	0	0	7	37,936
Sutter	1	0	0	0	1	3,939
Tehama	10	0	0	2	8	44,507
Tulare	1	0	0	0	1	716
Ventura	33	5	0	0	28	247,795
Yolo	6	0	0	0	6	27,299
Total	402	32	0	27	343	2,293,020

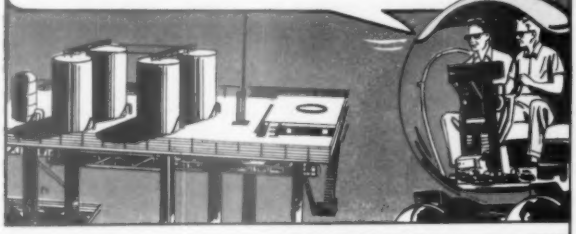
CALIFORNIA
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Butte	2	0	0	2	0	0	5,658
Colusa	2	0	0	1	1	0	9,773
Contra Costa	3	0	0	1	2	0	11,217
Fresno	109	93	0	2	14	0	399,309
Glenn	24	0	0	13	11	0	132,506
Kern	546	469	0	1	73	3	2,206,228
Kings	4	1	0	2	1	0	5,136

1.

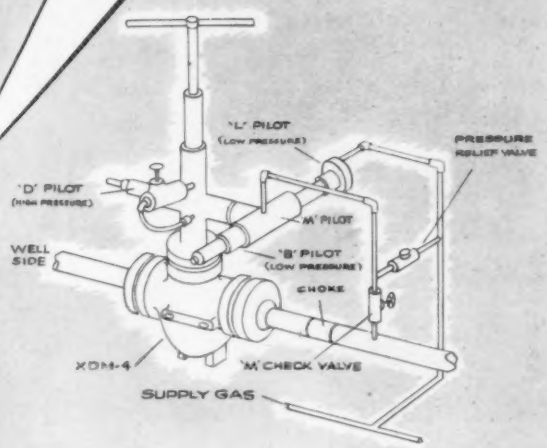
OTIS SURFACE SAFETY VALVES

— EQUIPPED WITH AUTOMATIC PILOTS — SHUT IN THE SIX WELLS ON THIS PLATFORM AND **PREVENTED A MAJOR FIRE** THAT COULD HAVE COST US SEVERAL MILLION DOLLARS.



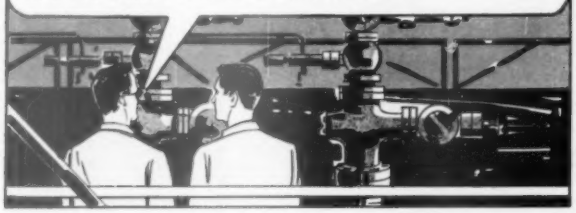
2.

HERE'S A DIAGRAM OF THE SAFETY VALVE AND AUTOMATIC PILOT INSTALLATION WE HAD ON THIS PLATFORM. EACH OF THE SIX WELLS HAD A TYPE XDM-4 OTIS SURFACE SAFETY VALVE INSTALLED BETWEEN THE WING VALVE AND THE CHOKE. THE SAFETY VALVES AND PILOTS WERE INSTALLED SO AS TO (1) SHUT IN AN INDIVIDUAL WELL SHOULD A FREEZING CONDITION EXIST IN A FLOW LINE OR CHOKE; (2) SHUT IN ALL WELLS ON THE PLATFORM SHOULD A FLOW LINE BREAK, OR (3) SHUT IN ALL WELLS ON THE PLATFORM SHOULD THE GAS SALES LINE BREAK, OR SHOULD SOMETHING HAPPEN TO ANY OF THE AUXILIARY EQUIPMENT ON THE PLATFORM. IN THIS CASE IT WAS HIGH TEMPERATURE ON A HEATER THAT ACTIVATED A TYPE L OTIS PILOT TO SHUT IN ALL THE WELLS.



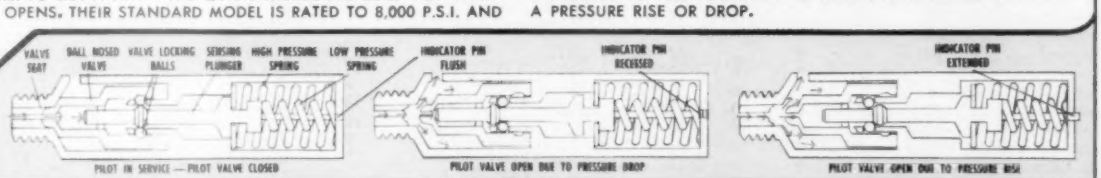
3.

THE SIX WELLS WERE PRODUCING 32 M.M.C.F.D. WHEN AN EQUIPMENT FAILURE BOOSTED THE TEMPERATURE IN ONE OF THE HEATERS TO ABOUT 1,000° F. THIS SET THE PLATFORM ON FIRE. BUT WE DIDN'T LOSE OUR WELLS OR THE PLATFORM — THANKS TO THE OTIS SAFETY VALVES. WHEN OUR PUMPER GOT OUT THERE HE FOUND ALL OF THE WELLS SHUT IN, AND ONLY A SMALL FIRE BURNING, WHICH HE EXTINGUISHED. AFTER MAKING LIMITED REPAIRS, THE SAFETY VALVES AND PILOTS WERE RESET AND THE WELLS PUT BACK ON PRODUCTION.



4.

SPEAKING OF RESETTING PILOTS, HAVE YOU SEEN THE NEW TYPE E OTIS HI-LO PILOT? IT'S SO SIMPLE TO SET AND RESET A TEN-YEAR-OLD BOY COULD DO IT. HERE ARE THREE SCHEMATIC DIAGRAMS OF THE TYPE E, SHOWING THE PILOT IN ITS THREE OPERATING POSITIONS: SET AND READY TO OPERATE; OPENED AS A RESULT OF A PRESSURE DROP; OPENED AS A RESULT OF A PRESSURE RISE. THE NEW TYPE E PILOT HAS MANY FEATURES WE LIKE. TO LIST A FEW — IT'S QUIET. THERE'S NO LOUD POP WHEN IT OPENS. THEIR STANDARD MODEL IS RATED TO 8,000 P.S.I. AND WE CAN GET HIGHER PRESSURE RATINGS ON SPECIAL ORDER. THE TYPE E IS ADAPTABLE TO REMOTE CONTROL OR EXTERNAL CONTROL SYSTEMS USING ELECTRICITY, HYDRAULIC PRESSURE, OR MICROWAVE. YOU CAN TRIP THE PILOT MANUALLY WITHOUT ANY SPECIAL TOOLS. WE'VE FOUND THE PILOT ACCURATE TO PLUS OR MINUS 1%. IT HAS A VISUAL INDICATOR TO TELL YOU WHEN THE PILOT IS LOCKED OUT OF SERVICE, AND ANOTHER INDICATOR TO TELL YOU WHETHER THE PILOT OPERATED DUE TO A PRESSURE RISE OR DROP.



5.

TO GET BACK TO RESETTING THE TYPE E OTIS HI-LO PILOT — HERE'S ALL YOU DO. AFTER THE PILOT HAS OPERATED YOU TWIST THIS RESET COLLAR TO THE RIGHT. THIS CLOSES THE PILOT AND EXPOSES A RED BAND, WHICH IS A VISUAL INDICATION THAT THE PILOT IS LOCKED OUT OF SERVICE. WHEN THE INDICATOR PIN IS FLUSH WITH THE END OF THE PILOT YOU CAN PUT THE WELL BACK ON PRODUCTION BY TWISTING THE RESET COLLAR TO THE LEFT. WE'LL BE USING A LOT OF THESE PILOTS IN THE FUTURE BECAUSE OF THEIR SIMPLICITY AND MANY ADVANTAGES.

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6.

THE OTIS SURFACE SAFETY VALVES AND PILOTS WE INSTALLED ON OUR PLATFORM ONLY COST $6,500. THAT'S A PRETTY SMALL INVESTMENT TO PROTECT A SEVERAL-MILLION-DOLLAR INSTALLATION. AND THIS ISN'T THE FIRST TIME OTIS SAFETY EQUIPMENT HAS SAVED US A SUBSTANTIAL LOSS. EXPERIENCE HAS TAUGHT US WE CAN RELY ON OTIS SAFETY EQUIPMENT. IF YOU HAVE **ANY UNPROTECTED WELLS** — ESPECIALLY IN ISOLATED LOCATIONS OR IN CRITICAL AREAS — I SUGGEST YOU CALL YOUR NEAREST OTIS OFFICE NOW. LET AN OTIS SAFETY VALVE EXPERT HELP YOU WORK UP THE PROPER SAFETY PROGRAM FOR YOUR WELLS—**TODAY—BEFORE YOU NEED IT.**

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OTIS

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1959 WILDCAT AND FIELD DRILLING

CALIFORNIA (Continued)

County—	Total	Crude	Cond.	Gas	Dry		Footage
Los Angeles	141	72	0	0	17	52	764,893
Monterey	21	18	0	0	2	1	48,723
Orange	70	60	0	0	6	4	190,351
Riverside	1	0	0	0	1	0	4,609
Sacramento	9	2	0	5	2	0	48,232
Santa Barbara	17	13	0	0	3	1	92,156
San Benito	8	5	0	0	3	0	37,208
San Bernardino	3	2	0	0	1	0	7,710
San Joaquin	13	0	0	9	4	0	58,569
San Luis Obispo	3	3	0	0	0	0	7,800
San Mateo	7	3	0	0	4	0	13,752
Solano	4	0	0	4	0	0	27,311
Sonoma	1	0	0	1	0	0	1,874
Stanislaus	1	0	0	0	1	0	4,351
Tehama	1	0	0	0	1	0	5,460
Tulare	9	2	0	5	2	0	24,681
Ventura	129	109	0	0	20	0	942,322
Total	1,128	852	0	46	169	61	5,049,829

COLORADO
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Adams	23	5	0	1	17	133,888
Arapahoe	3	0	0	0	3	17,551
Archuleta	7	0	0	0	7	15,369
Baca	8	0	0	1	7	42,536
Bent	4	0	0	0	4	20,066
Boulder	2	0	0	0	2	7,049
Dolores	1	0	0	0	1	5,907
Elbert	6	0	0	0	6	33,605
El Paso	1	0	0	0	1	485
Fremont	1	0	0	0	1	225
Garfield	9	1	0	2	6	37,309
Grand	2	0	0	0	2	5,877
Huerfano	7	0	0	0	7	18,543
Jackson	5	1	0	0	4	19,580
Kiowa	2	1	0	0	1	10,477
Kit Carson	4	0	0	0	4	22,413
Larimer	4	0	0	0	0	20,370
La Plata	10	2	0	4	4	60,840
Las Animas	5	0	0	0	5	15,333
Logan	65	6	0	3	56	331,842
Mesa	10	0	0	2	8	33,508
Moffat	23	0	0	1	22	135,294
Montezuma	15	4	0	0	11	50,635
Montrose	1	0	0	0	1	15,000
Morgan	64	6	0	1	57	372,247
Ouray	3	0	0	0	3	5,697
Prowers	4	1	0	0	3	21.893
Pueblo	2	0	0	0	2	8,206
Rio Blanco	15	1	0	4	10	80,809
Routt	17	2	0	0	15	65,850
San Miguel	1	0	0	0	1	10,847
Washington	73	7	0	1	65	365,755
Weld	52	0	0	3	49	355,206
Yuma	7	0	0	0	7	38,601
Total	456	37	0	23	396	2,378,813

COLORADO
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Adams	18	3	0	0	15	0	110,959
Archuleta	1	1	0	0	0	0	1,280
Fremont	15	4	0	1	10	0	42,615
Garfield	4	0	0	2	2	0	18,841
Jackson	5	3	0	0	2	0	25,034
Kiowa	4	0	0	3	1	0	19,883
La Plata	36	1	0	33	2	0	214,848
Larimer	2	1	0	0	1	0	11,162
Logan	54	19	0	2	31	2	272,813
Mesa	3	0	0	2	1	0	13,220
Moffat	12	5	0	3	4	0	60,921
Montezuma	5	1	0	0	4	0	29,826
Morgan	73	34	1	6	32	0	436,410
Prowers	1	0	0	0	1	0	5,185
Rio Blanco	26	14	0	4	8	0	101,829
Routt	4	2	0	0	2	0	20,967
Sedgwick	1	0	0	1	0	0	3,454
Washington	75	33	1	3	36	2	371,416
Weld	14	2	0	0	12	0	95,631
Total	353	123	2	60	164	4	1,856,294

FLORIDA
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Bay	1	0	0	0	1	4,748
Franklin	1	0	0	0	1	7,031
Gladsden	1	0	0	0	1	4,186
Hendry	1	0	0	0	1	11,646
Liberty	1	0	0	0	1	10,011
Monroe	2	0	0	0	2	21,508
Total	7	0	0	0	7	59,130

ILLINOIS
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Adams	10	0	0	0	10	6,119
Bond	4	1	0	0	3	4,949
Brown	3	1	0	0	2	2,037
Christian	17	2	0	0	15	33,529
Clark	9	0	0	0	9	12,309
Clay	32	11	0	0	21	87,241
Clinton	19	1	0	0	18	29,676
Coles	10	0	0	0	10	14,123
Crawford	4	0	0	1	3	3,823
Cumberland	4	1	0	0	3	8,006
Douglas	12	0	0	0	12	13,270
Edgar	5	0	0	0	5	3,113
Edwards	3	1	0	0	2	10,014
Effingham	10	1	0	0	9	24,597
Fayette	6	1	0	0	5	16,181
Franklin	10	1	0	0	9	31,023
Gallatin	4	1	0	0	3	11,687
Greene	1	0	0	0	1	840
Hamilton	4	2	0	0	2	14,456
Jackson	2	0	0	0	2	1,894
Jasper	10	1	0	0	9	29,941
Jefferson	10	2	0	0	8	32,706
Johnson	1	0	0	0	1	601
Kankakee	2	0	0	0	2	2,383
Lawrence	2	2	0	0	0	3,915
Logan	3	0	0	0	3	5,017
McDonough	2	0	0	0	2	1,539
Macon	5	2	0	0	3	11,344
Macoupin	19	0	0	0	19	11,441
Madison	8	0	0	0	8	9,384
Marion	20	3	0	0	17	42,437
Mason	1	0	0	0	1	1,167
Menard	3	0	0	0	3	3,155
Montgomery	10	2	0	0	8	13,121
Moultrie	10	0	0	0	10	26,360
McLean	1	0	0	0	1	2,012
Perry	9	0	0	0	9	11,496
Piatt	4	0	0	0	4	8,245
Pike	1	0	0	0	1	995
Pope	2	0	0	0	2	8,204
Randolph	10	0	0	0	10	15,401
Richland	6	3	0	0	3	19,317
St. Clair	8	0	0	0	8	5,152
Saline	10	4	0	0	6	27,898
Sangamon	4	1	0	0	3	6,449
Shelby	10	0	0	0	10	19,078
Tazewell	8	0	0	0	8	11,178
Vermillion	2	0	0	0	2	3,449
Wabash	2	0	0	0	2	4,948
Warren	1	0	0	0	1	755
Washington	12	0	0	0	12	17,570
Wayne	12	1	0	0	11	40,357
White	10	1	0	0	9	31,357
Will	1	0	0	0	1	140
Williamson	3	1	0	0	2	5,053
Total	391	47	0	1	343	762,452

ILLINOIS
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Service	Footage
Adams	11	3	0	0	8	0	6,326
Bond	23	10	0	0	13	0	46,461

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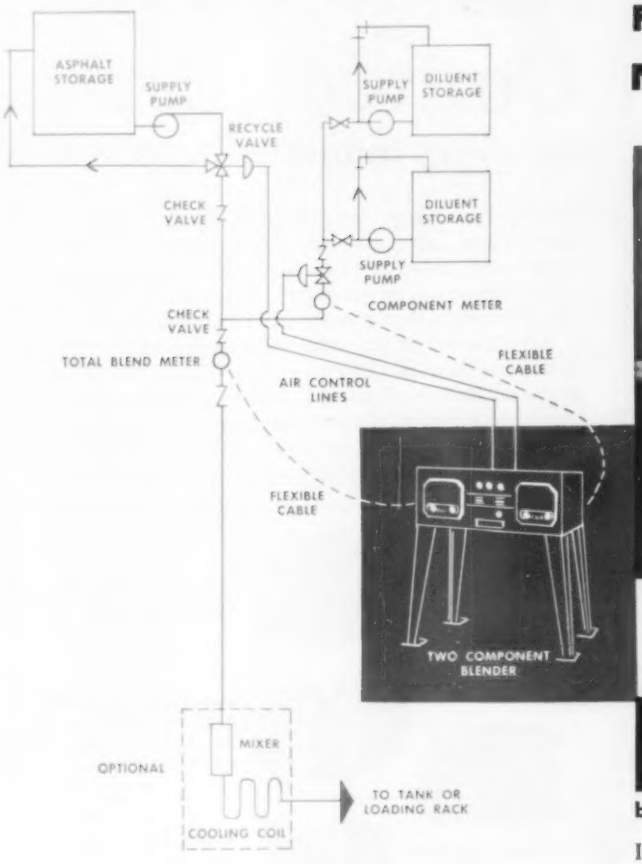

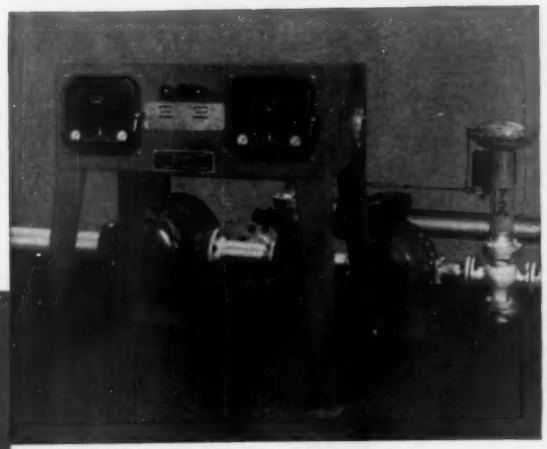

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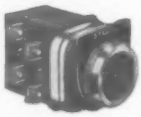

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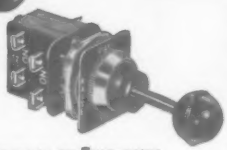

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ILLINOIS (Continued)

County—	Total	Crude	Cond.	Gas	Dry	Footage
Brown	15	3	0	0	12	0	9,416
Champaign	1	0	0	0	1	0	
Christian	157	105	0	0	45	7	308,257
Clark	60	42	0	1	15	2	103,112
Clay	135	78	0	0	47	10	389,407
Clinton	39	22	0	0	11	6	70,931
Coles	26	9	0	2	10	5	30,000
Crawford	159	53	0	0	45	61	188,922
Cumberland	11	2	0	0	9	0	24,838
Douglas	7	5	0	0	2	0	14,191
Edgar	2	0	0	0	2	0	3,590
Edwards	12	2	0	0	6	4	34,592
Effingham	30	9	0	0	17	4	76,083
Fayette	27	12	0	0	11	4	51,734
Franklin	59	22	0	0	31	6	170,353
Gallatin	70	48	0	0	22	0	185,362
Hamilton	90	41	0	0	29	20	277,353
Jasper	60	34	0	0	22	4	167,284
Jefferson	60	37	0	0	23	0	151,273
Lawrence	212	136	0	0	20	56	351,211
McDonough	3	1	0	0	2	0	1,515
Macon	3	1	0	0	2	0	6,132
Macoupin	43	5	0	0	37	1	25,897
Madison	4	2	0	0	2	0	4,663
Marion	83	29	0	5	30	19	127,726
Mason	1	0	0	0	1	0	1,400
Montgomery	4	2	0	0	2	0	3,629
Perry	2	0	0	0	2	0	2,512
Pike	4	0	0	0	4	0	3,616
Pope	1	1	0	0	0	0	703
Randolph	6	2	0	0	4	0	14,708
Richland	40	14	0	0	18	8	116,721
Saline	43	17	0	0	25	1	123,413
Sangamon	15	2	0	0	13	0	26,663
Shelby	5	5	0	0	0	0	10,352
St. Clair	9	0	0	0	5	4	8,172
Wabash	93	49	0	0	36	8	223,502
Washington	18	7	0	0	10	1	30,354
Wayne	141	69	0	0	54	18	451,193
White	179	81	0	0	70	28	522,407
Williamson	3	2	0	0	1	0	7,749
Total	1,966	962	0	8	719	277	4,373,723

INDIANA
Wildcat Completions by Counties

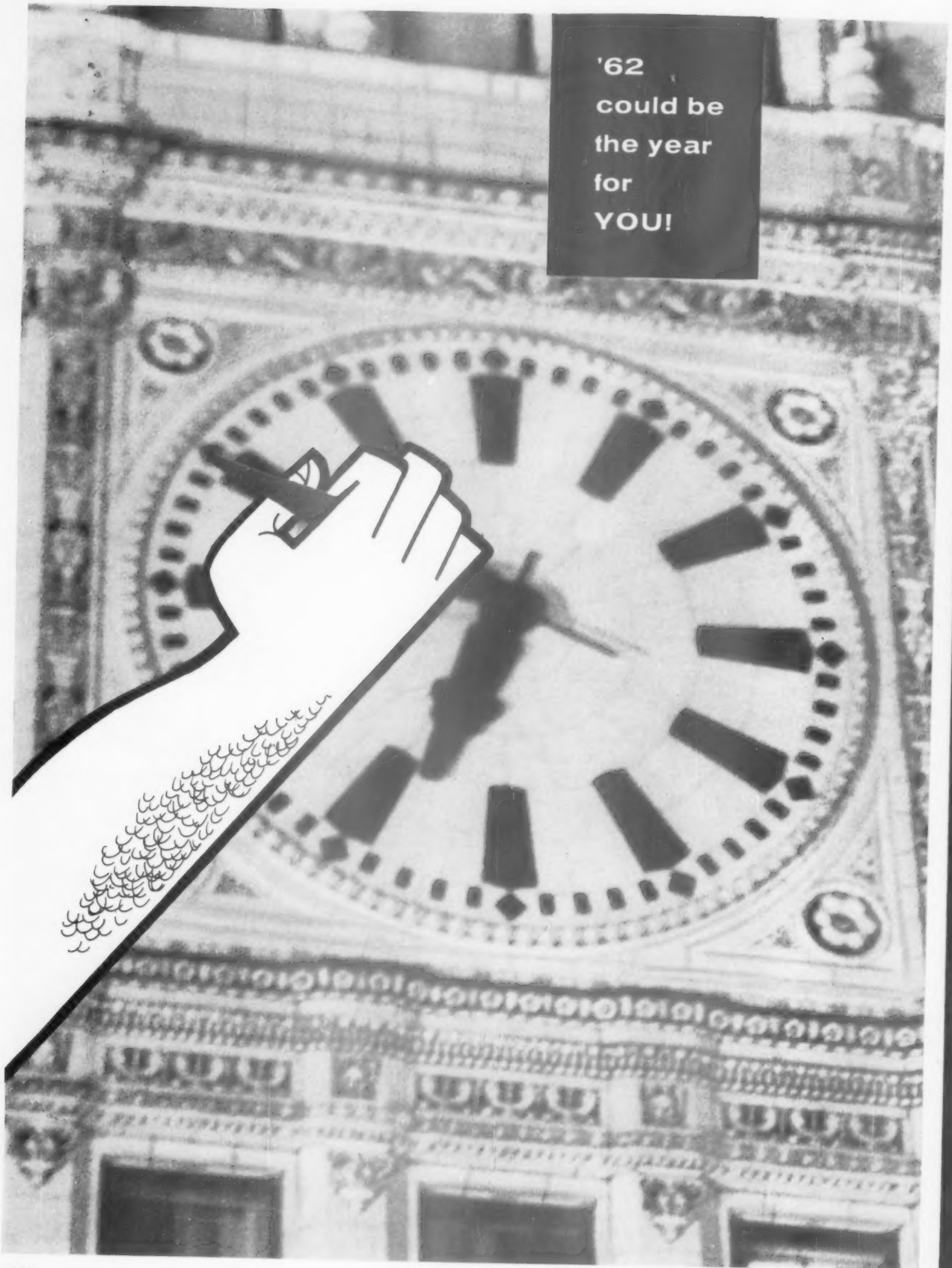
County—	Total	Crude	Cond.	Gas	Dry	Footage
Clay	2	0	0	0	2	3,383
Daviess	12	0	0	0	12	12,810
Dekalb	5	0	0	0	5	8,796
Dubois	7	2	0	0	5	7,954
Gibson	80	17	0	0	63	154,188
Greene	7	0	0	0	7	10,429
Harrison	3	0	0	0	3	1,617
Jackson	1	0	0	0	1	179
Jennings	2	0	0	0	2	340
Knox	3	1	0	0	2	4,802
Lawrence	1	0	0	0	1	116
Martin	2	0	0	0	2	786
Monroe	1	0	0	0	1	740
Morgan	2	0	0	0	2	3,536
Perry	27	3	0	0	24	15,196
Pike	8	0	0	0	8	11,890
Posey	23	1	0	0	22	45,693
Scott	2	0	0	0	2	300
Spencer	66	3	0	0	63	73,096
Steuben	1	0	0	0	1	2,982
Sullivan	10	0	0	0	10	13,049
Vanderburg	18	1	0	0	17	37,964
Vigo	8	0	0	0	8	13,311
Warrick	9	1	0	0	8	15,416
Total	300	29	0	0	271	438,573

INDIANA
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Service	Footage
Adams	1	1	0	0	0	0	1,086
Clay	2	2	0	0	0	0	3,044
Crawford	1	0	0	0	1	0	1,382
Daviess	12	6	0	0	6	0	13,540
Decatur	6	0	0	6	0	0	1,776
Dubois	16	2	0	0	14	0	11,068
Gibson	236	120	0	0	114	2	426,156
Harrison	2	0	0	0	2	0	445
Huntington	1	0	0	0	1	0	1,033
Jay	1	1	0	0	0	0	1,060
Knox	9	0	0	0	9	0	13,156
Lawrence	1	0	0	0	1	0	6,806
Martin	1	1	0	0	0	0	552
Miami	6	4	0	0	2	0	5,531
Monroe	2	1	0	0	1	0	3,641
Perry	18	3	0	0	15	0	10,214
Pike	55	23	0	0	32	0	74,606
Posey	64	33	0	0	29	2	138,896
Rush	1	0	0	1	0	0	867
Shelby	4	0	0	4	0	0	3,527
Spencer	87	40	0	0	44	3	92,128
Sullivan	7	2	0	0	5	0	8,236
Vanderburg	28	12	0	0	15	1	36,983
Vigo	1	1	0	0	0	0	1,893
Warrick	18	14	0	0	4	0	23,343
Total	580	266	0	11	295	8	880,969

KANSAS
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Barber	20	2	0	2	16	91,270
Barton	22	6	0	0	16	72,086
Butler	41	3	0	0	38	119,467
Chase	20	1	0	0	19	53,177
Chautauqua	3	1	0	0	2	7,350
Cheyenne	11	2	0	0	9	58,073
Clark	5	0	0	4	1	28,935
Clay	3	0	0	0	3	9,973
Cloud	1	0	0	0	1	3,098
Comanche	2	0	0	0	2	12,200
Cowley	59	4	0	0	55	186,885
Decatur	15	0	0	0	15	62,007
Dickinson	6	0	0	0	6	14,603
Douglas	1	0	0	0	1	1,103
Edwards	21	4	0	1	16	97,314
Elk	7	0	0	0	7	15,795
Ellis	47	6	0	0	41	171,223
Ellsworth	9	0	0	0	9	29,697
Finney	15	4	0	0	11	71,772
Ford	1	0	0	0	1	5,174
Geary	6	0	0	0	6	13,170
Gove	3	0	0	0	3	13,129
Graham	37	8	0	0	29	146,967
Grant	16	2	0	8	6	86,154
Greeley	1	0	0	0	1	3,450
Greenwood	10	0	0	0	10	21,516
Hamilton	6	0	0	0	6	25,747
Harper	13	2	0	1	10	61,478
Harvey	20	1	0	0	19	66,563
Haskell	14	8	0	0	6	77,263
Hodgeman	15	5	0	0	10	69,246
Jackson	1	0	0	0	1	3,599
Kearny	3	0	0	1	2	15,625
Kingman	27	2	0	1	24	116,487
Kiowa	14	1	0	0	13	70,329
Lane	3	0	0	0	3	14,543
Lincoln	1	0	0	0	1	3,695
Logan	3	0	0	0	3	15,155
Lyon	10	0	0	0	10	22,750
McPherson	25	1	0	0	24	84,067
Marion	41	2	0	0	39	108,636
Meade	21	1	1	7	12	123,267
Morris	17	0	0	0	17	40,800
Morton	6	0	0	5	1	32,049
Ness	14	3	0	0	11	63,667
Norton	16	0	0	1	15	61,177
Osborne	6	0	0	0	6	23,817
Pawnee	18	2	0	0	16	73,999
Phillips	4	3	0	0	1	14,340
Pottawatomie	10	0	0	0	10	18,532
Pratt	15	2	0	0	13	67,990
Rawlins	19	3	0	0	16	91,092
Reno	23	3	0	1	19	90,091
Rice	9	2	0	0	7	31,236
Riley	8	1	0	0	7	16,510
Rooks	25	6	0	0	19	90,920
Rush	8	2	0	0	6	33,763
Russell	18	5	0	0	13	60,088
Saline	13	0	0	0	13	39,247


'62
could be
the year
for
YOU!

you can't stop time!

Nor progress! They both march on . . . creating change and opportunity.

Right now, for example, the petroleum refining industry has adequate crude capacity, but is running short on certain intermediate and gasoline finishing processes. According to the consensus of informed opinion, present catalytic cracking, reforming, and alkylation capacity will be insufficient to meet anticipated demand in 1962.

In creating demand for more and better products, you can make time work in your favor. It can also work against you! It takes *time* to plan, build and put into operation new or expanded process facilities . . . in most cases from one to two years.

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UNIVERSAL OIL PRODUCTS COMPANY

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The Finest Products Made with Aluminum are made with REYNOLDS ALUMINUM

Less than one-third the weight of its steel equivalent . . . 30 feet of 2½" aluminum pipe weighs just 26 lbs! Three men can install and pick up 1 to 1½ miles of this pipe per hour—10 times faster than equivalent steel pipe. Reynolds Aluminum Oil Country Pipe takes a real beating, resists corrosion, won't rust ever. Takes a variety of standard couplings. Available for fast delivery from Reynolds Oil Country Pipe Distributors at most oil field supply stores. *Reynolds Metals Company, Box 2346-CR, Richmond 18, Va.*

Watch Reynolds TV shows—"ALL STAR GOLF", "BOURBON STREET BEAT" and "ADVENTURES IN PARADISE"—ABC-TV

KANSAS (Continued)

County—	Total	Crude	Cond.	Gas	Dry	Footage
Scott	2	0	0	0	2	9,875
Sedgwick	22	1	0	0	21	75,173
Seward	6	2	0	0	4	37,597
Sheridan	32	4	0	0	28	136,090
Sherman	2	0	0	0	2	10,715
Stafford	33	3	0	3	27	136,491
Stanton	7	2	0	1	4	38,716
Stevens	16	0	0	8	8	97,717
Sumner	56	8	0	0	48	227,971
Thomas	6	1	0	0	5	30,379
Trego	31	2	0	0	29	82,480
Wabaunsee	16	1	0	0	15	47,319
Wallace	4	0	0	0	4	19,207
Washington	4	0	0	0	4	12,608
Wichita	1	0	0	0	1	5,341
Total	1,066	122	1	44	899	4,091,035

KANSAS
Development Completions by Counties

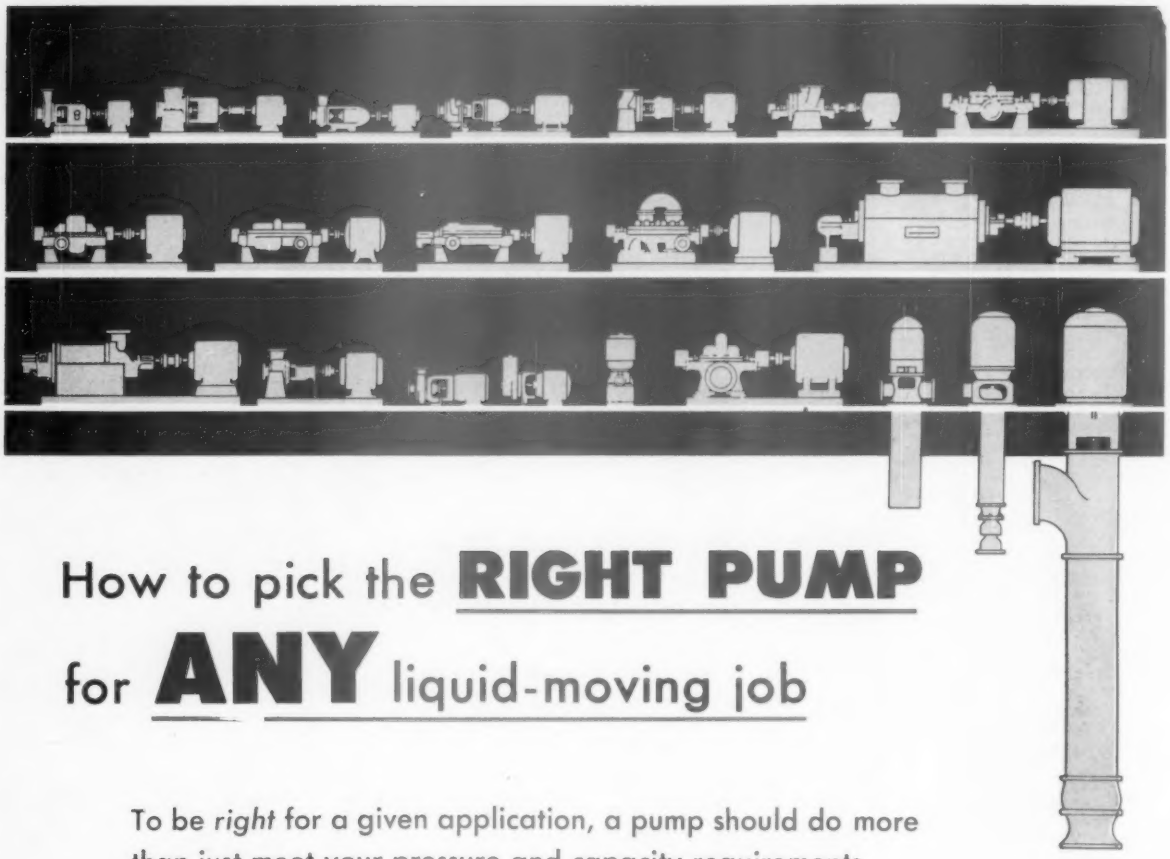
County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Barber	59	17	0	17	25	0	279,514
Barton	196	101	0	1	88	6	664,809
Butler	177	103	0	0	66	8	471,326
Chase	10	6	0	0	4	0	25,577
Cheyenne	3	1	0	0	2	0	14,325
Clark	8	0	1	4	3	0	47,584
Clay	1	0	0	0	1	0	2,163
Comanche	4	0	0	0	4	0	22,260
Cowley	176	102	0	1	64	9	504,648
Decatur	5	3	0	0	2	0	19,037
Dickinson	3	1	0	0	2	0	7,430
Edwards	92	57	1	9	24	1	411,899
Elk	3	1	0	0	2	0	8,668
Ellis	196	104	0	0	88	4	710,917
Ellsworth	13	2	0	0	10	1	43,567
Finney	59	24	0	30	5	0	231,346
Ford	1	0	0	1	0	0	5,155
Graham	155	79	0	0	72	4	611,052
Greenwood	218	157	0	0	58	3	462,946
Harper	51	40	0	1	9	1	233,445
Harvey	28	13	0	0	13	2	85,097
Haskell	18	9	0	4	5	0	92,922
Hodgeman	12	8	0	0	4	0	56,004
Kearny	1	0	0	1	0	0	2,669
Kingman	105	71	0	6	25	3	454,230
Kiowa	23	16	0	0	7	0	115,172
Lyon	4	0	0	0	2	2	7,607
McPherson	98	62	0	0	35	1	311,152
Marion	214	173	0	2	28	11	531,473
Meade	55	9	6	18	22	0	319,273
Morris	14	5	0	9	0	0	28,148
Morton	14	9	0	3	2	0	66,512
Nemaha	2	1	0	0	1	0	4,208
Ness	18	10	0	0	6	2	75,396
Norton	18	9	0	0	9	0	66,265
Osborne	3	2	0	0	1	0	10,226
Pawnee	10	0	0	0	10	0	41,322
Phillips	11	10	0	0	1	0	39,772
Pottawatomie	1	0	0	0	1	0	2,285
Pratt	40	17	0	2	19	2	176,322
Rawlins	26	23	0	0	3	0	115,656
Reno	49	24	0	7	17	1	185,487
Rice	63	34	0	0	29	0	210,501
Riley	18	16	0	0	2	0	31,964
Rooks	97	54	0	0	41	2	353,747
Rush	14	3	0	3	8	0	53,782
Russell	123	73	0	0	43	7	397,661
Saline	22	19	0	0	3	0	71,071
Scott	1	0	0	0	1	0	4,840
Sedgwick	52	20	0	0	29	3	158,506
Seward	10	0	0	6	4	0	51,781
Sheridan	14	3	0	0	11	0	57,271
Sherman	9	6	0	0	2	1	44,779
Stafford	141	74	0	0	65	2	562,522
Stevens	7	0	0	5	2	0	43,770
Sumner	88	45	0	0	40	3	319,833
Trego	29	13	0	0	16	0	114,190
Wabaunsee	7	5	0	0	2	0	21,598
Woodson	4	4	0	0	0	0	6,178
Total	2,893	1,638	8	130	1,038	79	10,068,860

KENTUCKY
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Adair	1	1	0	0	0	396
Allen	7	0	0	0	7	2,771
Barren	12	0	0	0	12	6,404
Breathitt	28	9	0	3	16	49,392
Breckinridge	30	3	0	0	27	14,611
Butler	1	0	0	0	1	1,507
Caldwell	1	0	0	0	1	1,450
Carter	3	0	0	0	3	6,440
Christian	7	0	0	0	7	9,684
Clay	3	0	0	0	3	5,057
Cumberland	23	0	0	0	23	20,860
Daviess	38	3	0	0	35	63,082
Elliott	1	0	0	0	1	520
Grayson	20	2	0	0	18	22,269
Green	10	1	0	0	9	5,722
Greenup	2	0	0	0	2	1,581
Hancock	12	1	0	0	11	7,156
Hardin	13	0	0	0	13	15,488
Hart	9	1	0	0	8	7,414
Henderson	20	3	0	0	17	46,179
Hopkins	1	0	0	0	1	2,120
Johnson	1	0	0	0	1	1,783
Lawrence	4	1	0	0	3	9,129
LaRue	7	0	0	0	7	4,890
Lee	4	0	0	0	4	4,827
Leslie	2	0	0	0	2	15,438
Logan	11	0	0	0	11	13,384
McLean	13	2	0	0	11	30,501
Magoffin	4	0	0	0	4	6,837
Meade	5	0	0	0	5	6,307
Menifee	2	0	0	0	2	2,644
Metcalfe	8	2	0	0	6	4,021
Monroe	6	0	0	0	6	4,291
Morgan	4	0	0	0	4	6,801
Muhlenberg	13	2	0	0	11	18,373
Ohio	20	2	0	0	18	20,155
Owsley	7	0	0	0	7	10,457
Rowan	4	0	0	0	4	2,149
Simpson	2	1	0	0	1	1,248
Taylor	9	6	0	0	3	4,879
Todd	7	0	0	0	7	6,367
Twigg	1	0	0	0	1	2,000
Union	4	1	0	0	3	6,211
Warren	1	0	0	0	1	800
Webster	4	2	0	0	2	7,011
Whitley	2	1	0	1	0	2,280
Wolfe	2	0	0	0	2	3,327
Total	389	44	0	4	341	486,213

KENTUCKY
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Service	Footage
Barren	1	0	0	0	1	0	1,402
Bell	3	1	0	1	1	0	8,684
Breathitt	105	73	0	6	26	0	155,466
Breckinridge	38	9	0	0	27	2	14,679
Butler	17	4	0	1	12	0	16,975
Christian	22	8	0	0	13	1	19,429
Clay	2	0	0	2	0	0	5,299
Clinton	23	23	0	0	0	0	9,200
Cumberland	5	5	0	0	0	0	3,055
Daviess	143	61	0	0	80	2	194,257
Elliott	9	6	0	0	3	0	8,836
Estill	2	1	0	0	1	0	1,209
Floyd	20	2	0	11	7	0	34,665
Grayson	3	1	0	0	2	0	3,619
Green	1,595	1,482	0	0	92	21	861,122
Hancock	26	12	0	0	14	0	12,331
Hardin	17	17	0	0	0	0	10,387
Hart	9	8	0	0	1	0	6,323
Henderson	130	65	0	0	60	5	265,319
Hopkins	16	3	0	2	11	0	28,359
Johnson	2	0	0	1	1	0	3,977
Knott	32	0	0	31	1	0	98,384
Knox	4	1	0	1	2	0	3,623
Lawrence	21	5	0	14	2	0	35,170
Lee	4	2	0	0	2	0	7,242
Leslie	2	0	0	1	1	0	4,895
Letcher	13	0	0	10	3	0	43,067
Lincoln	32	32	0	0	0	0	6,080
McLean	38	16	0	0	21	1	58,356
Magoffin	18	1	0	10	7	0	22,613
Martin	28	0	0	27	1	0	92,404



How to pick the **RIGHT PUMP** for **ANY** liquid-moving job

To be *right* for a given application, a pump should do more than just meet your pressure and capacity requirements. Here are some facts to help you choose wisely.

STANDARD PUMPS save money. The Ingersoll-Rand line is so *complete* that you can get a *standard* pump for practically any job – including many that would be "special" from other manufacturers.

SPECIAL PUMPS and materials may be required for some applications. Ingersoll-Rand can build your special pumps with maximum utilization of standard parts and designs, resulting in important cost savings.

OPERATING COSTS depend on sustained high efficiency. The efficiency of I-R pumps stays high throughout years of service because they are designed with optimum running clearances that are easily maintained.

INTERCHANGEABILITY of parts between similar pumps can reduce your spare parts inventory. And all I-R pumps are designed with maximum parts interchangeability in mind.

ENGINEERING SERVICE by I-R pump specialists can help you every step of the way – from initial selection to installation, operation and maintenance.

After a pump is installed it is too late for regrets. Specifying Ingersoll-Rand pumps in the first place will assure the extra quality and dependability you want – and save you money in the long run.

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1959 WILDCAT AND FIELD DRILLING

KENTUCKY (Continued)

County—	Total	Crude	Cond.	Gas	Dry		Footage
Metcalfe	42	42	0	0	0	0	20,596
Morgan	1	0	0	0	1	0	2,150
Muhlenberg	132	60	0	13	57	2	153,013
Ohio	64	26	0	0	36	2	53,696
Owsley	1	0	0	0	1	0	1,065
Perry	6	0	0	5	1	0	17,174
Pike	150	3	0	134	13	0	562,029
Russell	7	7	0	0	0	0	2,102
Simpson	1	1	0	0	0	0	493
Taylor	110	100	0	0	10	0	55,328
Todd	3	0	0	0	3	0	1,505
Union	27	12	0	0	15	0	53,307
Warren	1	1	0	0	0	0	642
Webster	27	10	0	0	16	1	42,962
Whitley	24	2	0	15	7	0	31,009
Total	2,976	2,102	0	285	552	37	3,033,498

LOUISIANA OFFSHORE
Wildcat Completions by Areas

Area—	Total	Crude	Cond.	Gas	Dry	Footgae
West Cameron	2	0	0	0	2	20,837
Eugene Island	5	1	2	0	2	71,830
Main Pass	2	0	0	0	2	21,486
South Timbalier	1	0	0	0	1	15,160
Vermilion	3	0	0	0	3	37,438
West Delta	2	0	0	0	2	19,025
Total	15	1	2	0	12	185,776

LOUISIANA OFFSHORE
Development Completions by Areas

Area—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Bay Marchand	25	20	2	0	3	0	218,051
East Cameron	12	1	5	0	6	0	153,504
West Cameron	10	0	8	0	2	0	124,201
Eugene Island	81	42	15	0	24	0	928,776
Grand Isle	43	26	0	0	14	3	365,194
Main Pass	19	7	2	1	9	0	171,751
Ship Shoal	22	5	10	0	7	0	260,835
S. Marsh Island	14	4	5	1	4	0	171,525
South Pass	73	65	0	1	7	0	633,068
South Timbalier	37	24	2	0	11	0	405,629
Vermilion	31	3	11	5	12	0	322,223
West Delta	29	18	3	1	7	0	323,723
Total	396	215	63	9	106	3	4,078,480

NORTH LOUISIANA
Wildcat Completions by Parishes

Parish—	Total	Crude	Cond.	Gas	Dry	Footage
Bienville	8	0	0	0	8	47,128
Bossier	15	1	0	1	13	74,394
Caddo	15	2	0	0	13	67,606
Caldwell	5	0	0	1	4	24,189
Carroll (East)	1	0	0	0	1	7,584
Carroll (West)	2	0	0	0	2	8,349
Catahoula	43	5	0	1	37	258,237
Claiborne	7	2	0	2	3	51,203
Concordia	22	4	0	0	18	135,939
DeSoto	7	1	0	0	6	33,545
Franklin	13	0	0	1	12	69,910
Grant	7	0	0	0	7	28,476
Jackson	3	0	0	0	3	21,395
LaSalle	18	3	0	0	15	82,985
Lincoln	5	2	0	2	1	53,556
Madison	5	0	0	0	5	36,608
Natchitoches	4	0	0	0	4	15,262
Ouachita	5	0	0	5	0	49,376
Red River	14	0	0	2	12	49,283
Richland	2	1	0	0	1	7,974
Sabine	4	0	0	0	4	21,088
Tensas	13	1	0	2	10	111,350
Union	7	1	0	0	6	38,495
Webster	4	1	0	0	3	24,085
Winn	15	1	0	0	14	50,221
Total	244	25	0	17	202	1,368,238

NORTH LOUISIANA
Development Completions by Parishes

Parish—	Total	Crude	Cond.	Gas	Dry	Footage
Bienville	19	3	0	6	10	130,207
Bossier	29	5	0	12	12	143,663
Caddo	449	370	0	28	51	907,027
Caldwell	3	0	0	2	1	23,501
Catahoula	53	24	0	0	29	284,594
Claiborne	29	15	1	2	11	179,773
Concordia	54	19	0	0	35	310,073
DeSoto	179	86	0	14	79	475,716
East Carroll	1	0	0	0	1	2,412
Franklin	13	2	0	1	10	59,884
Grant	24	17	0	0	7	43,302
Jackson	1	0	0	0	1	8,600
LaSalle	119	62	0	5	52	327,691
Lincoln	12	0	2	10	0	111,571
Natchitoches	47	38	0	0	9	67,092
Ouachita	8	0	0	7	1	77,520
Red River	61	22	0	12	27	148,713
Richland	12	6	0	1	5	39,954
Sabine	12	7	0	0	5	36,036
Tensas	26	11	0	2	13	205,369
Union	43	0	0	36	7	102,393
Webster	57	32	0	6	19	297,917
Winn	22	8	0	0	14	36,749
Total	1,273	727	3	144	399	4,012,516

SOUTH LOUISIANA
Wildcat Completions by Parishes

Parish—	Total	Crude	Cond.	Gas	Dry	Footage
Acadia	9	1	3	1	4	100,172
Allen	11	0	0	0	11	103,854
Ascension	2	0	0	0	2	22,850
Assumption	2	0	0	0	2	26,940
Avoyelles	2	0	0	0	2	17,765
Beauregard	14	0	0	0	14	123,089
Calcasieu	18	0	1	0	17	179,477
Cameron	23	1	3	0	19	290,583
East Feliciana	1	0	0	0	1	10,020
Evangeline	6	0	0	0	6	63,621
Iberia	7	0	0	0	7	97,509
Iberville	6	0	0	0	6	73,106
Jefferson	2	0	0	0	2	23,172
Jefferson Davis	10	1	0	0	9	114,162
Lafayette	6	1	0	0	5	82,012
Lafourche	17	2	2	0	13	202,146
Livingston	1	0	0	0	1	11,163
Plaquemines	20	4	0	0	16	226,297
Pointe Coupee	5	0	0	0	5	49,958
Rapides	1	0	0	0	1	9,514
St. Bernard	3	0	0	0	3	32,265
St. Charles	3	1	0	0	2	30,421
St. James	1	0	0	0	1	10,450
St. John the Baptist	4	0	0	0	4	42,062
St. Landry	9	0	1	0	8	97,771
St. Martin	5	0	0	0	5	64,416
St. Mary	15	0	2	0	13	204,867
St. Tammany	2	0	0	0	2	13,079
Terrebonne	18	0	0	0	18	255,275
Vermilion	27	1	2	0	24	379,388
Vernon	2	0	0	0	2	17,525
West Baton Rouge	1	0	0	0	1	11,753
West Feliciana	1	0	0	0	1	10,286
Total	254	12	14	1	227	2,996,968

SOUTH LOUISIANA
Development Completions by Parishes

Parish—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Acadia	118	58	19	1	39	1	897,705
Allen	22	3	8	0	11	0	208,343
Ascension	14	3	4	2	3	2	120,412
Assumption	29	12	6	0	11	0	353,079
Beauregard	42	13	6	1	22	0	380,174
Calcasieu	68	25	11	2	30	0	495,255
Cameron	70	27	19	0	23	1	657,973
East Baton Rouge	2	1	0	0	1	0	20,621
Evangeline	8	3	0	0	5	0	72,555
Iberia	46	17	16	1	10	2	532,226
Iberville	34	27	0	0	7	0	233,571

1959 WILDCAT AND FIELD DRILLING

SOUTH LOUISIANA (Continued)

Parish—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Jefferson	36	25	1	0	10	0	388,485
Jefferson Davis	38	3	11	0	23	1	413,551
Lafayette	19	0	8	1	10	0	248,700
Lafourche	151	83	23	2	43	0	1,678,291
Orleans	1	1	0	0	0	0	7,850
Plaquemines	285	218	20	3	44	0	2,815,698
Pointe Coupee	6	3	0	0	3	0	61,452
Rapides	2	0	0	0	2	0	11,746
St. Bernard	5	3	0	0	2	0	42,256
St. Charles	33	15	4	0	14	0	342,301
St. James	4	1	1	0	2	0	46,666
St. John the Baptist	16	11	1	0	4	0	163,990
St. Landry	39	12	12	0	15	0	327,044
St. Martin	93	45	10	0	36	2	571,143
St. Mary	113	67	12	6	28	0	1,322,672
Terrebonne	217	109	55	5	48	0	2,760,650
Vermilion	85	21	32	1	30	1	1,047,657
West Baton Rouge	3	0	0	0	3	0	24,651
Total	1,599	806	279	25	479	10	16,246,717

MISSISSIPPI
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Adams	33	3	0	0	30	214,416
Amite	6	0	0	0	6	64,143
Chickasaw	1	0	0	0	1	5,400
Clarke	9	1	0	0	8	50,128
Copiah	2	0	0	0	2	26,016
Covington	1	0	0	0	1	14,218
Forrest	6	0	0	0	6	66,032
Franklin	13	2	0	0	11	114,169
George	1	0	0	0	1	11,511
Greene	4	0	0	0	4	44,449
Hancock	1	0	0	0	1	10,442
Hinds	7	1	0	0	6	70,269
Humphreys	1	0	0	0	1	9,383
Issaquena	6	0	0	0	6	36,886
Itawamba	3	0	0	1	2	4,349
Jackson	1	0	0	0	1	11,527
Jasper	5	1	0	0	4	53,598
Jefferson	16	1	0	0	15	108,759
Jefferson Davis	3	0	1	0	2	40,976
Jones	11	2	0	0	9	136,445
Lamar	2	0	0	0	2	18,726
Lawrence	2	0	0	0	2	20,772
Leake	2	0	0	0	2	10,082
Lincoln	13	1	0	0	12	140,880
Madison	8	0	0	0	8	58,576
Marion	5	1	0	1	3	50,659
Monroe	2	0	0	0	2	7,522
Newton	1	0	0	0	1	4,815
Oktibbeha	1	0	0	0	1	11,420
Pearl River	12	0	2	0	10	122,619
Perry	4	0	0	0	4	37,223
Pike	22	5	0	0	17	248,371
Rankin	3	0	0	0	3	36,721
Scott	8	1	0	0	7	67,363
Sharkey	4	0	0	0	4	21,752
Simpson	8	1	1	0	6	113,833
Smith	12	0	0	0	12	146,949
Stone	3	0	0	0	3	30,871
Walthall	2	1	0	0	1	20,620
Washington	3	0	0	0	3	12,221
Wayne	16	1	0	0	15	172,852
Wilkinson	16	0	0	0	16	117,920
Yazoo	4	0	0	0	4	28,666
Total	283	22	4	2	255	2,594,549

MISSISSIPPI
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Adams	39	19	0	0	20	0	245,564
Clarke	17	12	0	0	5	0	74,507
Forrest	17	2	12	0	3	0	136,799
Franklin	20	8	0	0	12	0	146,277
Hancock	2	0	2	0	0	0	21,932
Hinds	6	5	0	0	1	0	73,101
Issaquena	3	0	0	0	3	0	25,038
Jasper	6	3	0	0	3	0	62,170
Jefferson	1	0	0	0	1	0	9,292
Jefferson Davis	2	0	2	0	0	0	28,692
Jones	31	28	0	0	3	0	335,231
Lamar	12	11	0	0	1	0	111,975
Lincoln	40	31	0	0	9	0	436,296
Marion	7	2	4	0	1	0	77,137
Monroe	1	0	0	0	1	0	4,808
Pearl River	14	5	3	0	6	0	113,021
Pike	72	55	0	0	17	0	788,511
Scott	7	3	0	0	4	0	45,807
Simpson	16	13	0	0	3	0	214,986
Smith	17	16	0	0	1	0	228,914
Walthall	8	3	3	0	2	0	90,418
Wayne	15	9	0	0	6	0	124,806
Wilkinson	5	2	0	0	3	0	37,510
Yazoo	4	2	0	0	2	0	28,844
Total	362	229	26	0	107	0	3,481,636

MONTANA
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Big Horn	2	0	0	0	2	11,622
Blaine	2	0	0	0	2	8,611
Carbon	11	1	0	0	10	34,837
Carter	3	0	0	0	3	4,474
Cascade	3	0	0	0	3	15,266
Chouteau	1	0	0	0	1	4,549
Custer	1	0	0	0	1	2,892
Daniels	2	0	0	0	2	12,715
Dawson	2	1	0	0	1	18,827
Fallon	1	0	0	0	1	8,855
Fergus	3	0	0	0	3	7,189
Glacier	2	1	0	0	1	15,902
Golden Valley	2	0	0	0	2	7,305
Hill	2	0	0	0	2	7,170
Lake	1	0	0	0	1	685
Lewis and Clark	3	0	0	0	3	17,476
Liberty	4	0	0	0	4	12,710
McCone	2	1	0	0	1	18,998
Musselshell	14	2	0	0	12	68,568
Petroleum	9	0	0	0	9	33,371
Phillips	1	0	0	0	1	4,090
Pondera	3	0	0	0	3	4,944
Powder River	4	0	0	0	4	22,098
Prairie	1	0	0	0	1	9,100
Roosevelt	2	0	0	0	2	21,897
Rosebud	17	3	0	0	14	92,890
Sheridan	3	0	0	0	3	30,302
Stillwater	1	0	0	0	1	5,953
Sweetgrass	1	0	0	0	1	8,513
Teton	6	1	0	0	5	19,745
Toole	6	0	0	2	4	15,984
Treasure	1	0	0	0	1	4,172
Valley	1	0	0	0	1	4,690
Yellowstone	4	0	0	0	4	21,740
Total	121	10	0	2	109	578,140

MONTANA
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Big Horn	1	1	0	0	0	0	1,678
Blaine	1	1	0	0	0	0	4,100
Carbon	4	1	0	0	3	0	27,083
Dawson	13	12	0	0	1	0	122,882
Fallon	24	22	0	0	2	0	214,298
Garfield	1	1	0	0	0	0	1,072
Glacier	58	42	0	4	12	0	176,797
Golden Valley	1	0	0	1	0	0	2,025
Hill	1	0	0	0	1	0	3,736
Liberty	3	2	0	0	1	0	6,040
McCone	6	4	0	0	2	0	42,737
Musselshell	12	4	0	0	8	0	52,063
Petroleum	4	2	0	0	2	0	7,992
Pondera	11	7	0	0	4	0	24,218
Prairie	1	1	0	0	0	0	9,037
Richland	1	1	0	0	0	0	9,501
Roosevelt	4	4	0	0	0	0	22,659
Rosebud	38	28	0	0	10	0	198,070

This sprocket used to be machined from a flat pancake forging

Now Bethlehem forges it as shown—
and reduces manufacturing cost
by $29 per piece!
This 27-lb forged sprocket costs less
than the flat pancake forging did.
Our customer not only saves
on the cost of the metal,
but almost all* the machining cost, too.
Perhaps we can do the same for you.
Call or write our nearest sales office.

*The only machining our customer does is finish the bore, and take light cuts on the outside tooth contour. Bethlehem can forge to the contour of sprocket teeth, if an as-forged surface is satisfactory.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

1959 WILDCAT AND FIELD DRILLING

MONTANA (Continued)

County—	Total	Crude	Cond.	Gas	Dry		Footage
Teton	17	12	0	2	3	0	40,373
Toole	21	10	0	2	9	0	36,191
Wibaux	3	3	0	0	0	0	27,006
Yellowstone	2	0	0	0	2	0	12,435
Total	227	158	0	9	60	0	1,041,993

NEBRASKA
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Banner	144	16	0	0	128	889,070
Chase	5	0	0	0	5	16,641
Cheyenne	64	5	0	0	59	332,982
Dawes	2	0	0	0	2	5,265
Douglas	1	0	0	0	1	2,347
Dundy	2	0	0	0	2	10,619
Frontier	1	0	0	0	1	4,235
Hitchcock	7	3	0	0	4	31,901
Keith	1	0	0	0	1	1,837
Kimball	140	15	0	0	125	929,446
Lincoln	3	0	0	0	3	10,935
Morrill	26	1	0	0	25	120,772
Red Willow	5	1	0	0	4	20,847
Scotts Bluff	7	0	0	0	7	36,290
Sioux	1	0	0	0	1	4,793
Washington	1	0	0	0	1	1,695
Total	410	41	0	0	369	2,419,675

NEBRASKA
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Banner	165	95	0	0	70	0	986,278
Cheyenne	54	29	0	1	24	0	279,608
Deuel	2	0	0	0	2	0	6,678
Hitchcock	14	9	0	0	5	0	58,047
Kimball	249	112	0	0	137	0	1,597,433
Morrill	15	6	0	0	9	0	74,267
Richardson	1	1	0	0	0	0	3,289
Total	500	252	0	1	247	0	3,005,600

SOUTHEAST NEW MEXICO
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Chaves	53	3	0	0	50	199,972
DeBaca	4	0	0	0	4	10,095
Eddy	62	9	1	2	50	296,171
Lea	59	11	0	0	48	411,309
Lincoln	4	0	0	0	4	4,928
Mora	3	0	0	0	3	3,245
Quay	3	0	0	0	3	17,773
Roosevelt	4	1	1	0	2	39,779
San Miguel	3	0	0	0	3	12,555
Union	1	0	0	0	1	5,053
Total *	196	24	2	2	168	1,000,880

SOUTHEAST NEW MEXICO
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Chaves	85	66	0	3	13	3	251,269
Eddy	358	298	2	6	52	0	1,242,179
Lea	521	435	5	14	67	0	2,831,659
Roosevelt	9	6	0	0	2	1	86,429
Total	973	805	7	23	134	4	4,411,536

WEST NEW MEXICO
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Catron	1	0	0	0	1	1,198
Hidalgo	1	0	0	0	1	14,585
McKinley	6	1	0	0	5	15,852
Rio Arriba	5	0	1	0	4	23,717
Sandoval	8	2	1	0	5	25,472
San Juan	41	6	3	2	30	163,436
Sierra	1	0	0	0	1	9,765
Valencia	1	0	0	0	1	3,676
Total	64	9	5	2	48	257,701

WEST NEW MEXICO
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
McKinley	3	0	0	1	2	0	10,976
Rio Arriba	223	24	4	177	18	0	1,061,456
Sandoval	26	9	0	13	4	0	69,438
San Juan	592	368	34	141	40	9	1,872,326
Total	844	401	38	332	64	9	3,014,196

NORTH DAKOTA
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Billings	3	1	0	0	2	27,154
Bottineau	24	7	0	0	17	87,733
Burke	23	9	0	0	14	156,308
Cavalier	2	0	0	0	2	4,840
Divide	6	0	0	0	6	48,467
Dunn	3	1	0	0	2	32,157
Hettinger	1	0	0	0	1	7,502
McHenry	5	0	0	0	5	17,957
McKenzie	4	1	0	0	3	42,571
Morton	1	0	0	0	1	5,351
Mountrail	1	0	0	0	1	9,220
Pierce	1	0	0	0	1	3,117
Ramsey	2	0	0	0	2	4,305
Renville	1	0	0	0	1	4,185
Rolette	1	0	0	0	1	3,047
Stark	1	0	0	0	1	9,610
Stutsman	1	0	0	0	1	3,050
Ward	2	0	0	0	2	13,644
Williams	2	1	0	0	1	21,016
Total	84	20	0	0	64	501,234

NORTH DAKOTA
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Billings	5	4	0	0	1	0	41,903
Bottineau	108	70	0	0	38	0	395,493
Burke	121	89	0	0	32	0	811,740
Divide	17	10	0	0	7	0	128,304
McKenzie	60	57	0	0	3	0	568,186
Renville	17	11	0	0	6	0	72,606
Williams	24	12	5	0	7	0	267,226
Total	352	253	5	0	94	0	2,285,458

OHIO
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Ashtabula	3	1	0	2	0	13,607
Clinton	1	0	0	0	1	3,351
Coshocton	5	1	0	1	3	15,865
Crawford	1	0	0	0	1	2,160
Defiance	2	1	0	0	1	3,607
Fulton	2	0	0	0	2	5,827
Guernsey	2	2	0	0	0	2,894
Hamilton	1	0	0	0	1	2,730
Highland	1	0	0	0	1	3,482
Hocking	1	0	0	0	1	2,040
Holmes	2	2	0	0	0	7,863
Medina	2	0	0	1	1	9,780
Meigs	1	0	0	0	1	3,137
Miami	1	0	0	0	1	1,335
Morgan	3	0	0	0	3	14,152
Muskingum	2	0	0	1	1	8,600
Pickaway	1	0	0	0	1	3,257
Stark	1	0	0	1	0	4,243
Tuscarawas	2	0	0	0	2	8,970
Vinton	1	0	0	1	0	2,094
Wayne	4	0	0	1	3	13,738
Total	39	7	0	8	24	132,732

Only BOSTRON V-Belts

are made with...

BOSTRON Tensile Members PLUS NEOPRENE with FIBER-DISPERSED Stock

GREATER STABILITY — Changes in humidity — and the resulting moisture regain — often mean a matching problem with ordinary V-Belts. The moisture regain of BOSTRON is low — 0.4% — or 1/20th that of the conventional reinforcing fiber. This means far less time spent in matching, and lower belt inventory too.

HIGHER STRENGTH — Stronger belts can withstand more shock loading, need less maintenance. BOSTRON is approximately 40% stronger than the conventional fiber used in V-Belts.

STRETCH RESISTANCE — V-Belts reinforced with BOSTRON have low stretch. BOSTRON is inherently stretch-resistant and the cords are put through a special heat and tensioning process to further minimize stretch. Thus, belts reinforced with BOSTRON show comparatively little growth — even after many months of continued operation.

GREATER RESISTANCE to oils, heat, abrasion, chemicals and ozone is provided by Neoprene.

HIGH CROSS-WISE RIGIDITY is provided by the closely-packed, straight-line formation of the fibers in the compression member.

EXCEPTIONAL LENGTH-WISE FLEXIBILITY is provided by the virtually frictionless positioning of fibers.

EXTRA SUPPORT for the tensile members during shock-load impact and during normal operation.

The industry's most advanced developments are now standard in the entire BOSTON Multiple V-Belt line!

● CUT DOWN MAINTENANCE ● MAINTAIN SMALLER INVENTORY ● SAVE MATCHING TIME ● SAVE TAKE-UP TIME

BOSTON

BOSTON WOVEN HOSE & RUBBER COMPANY
DIV. OF AMERICAN BILTRITE RUBBER CO., INC.
BOSTON 3, MASS.

1959 WILDCAT AND FIELD DRILLING

OHIO
Development Completions by Counties

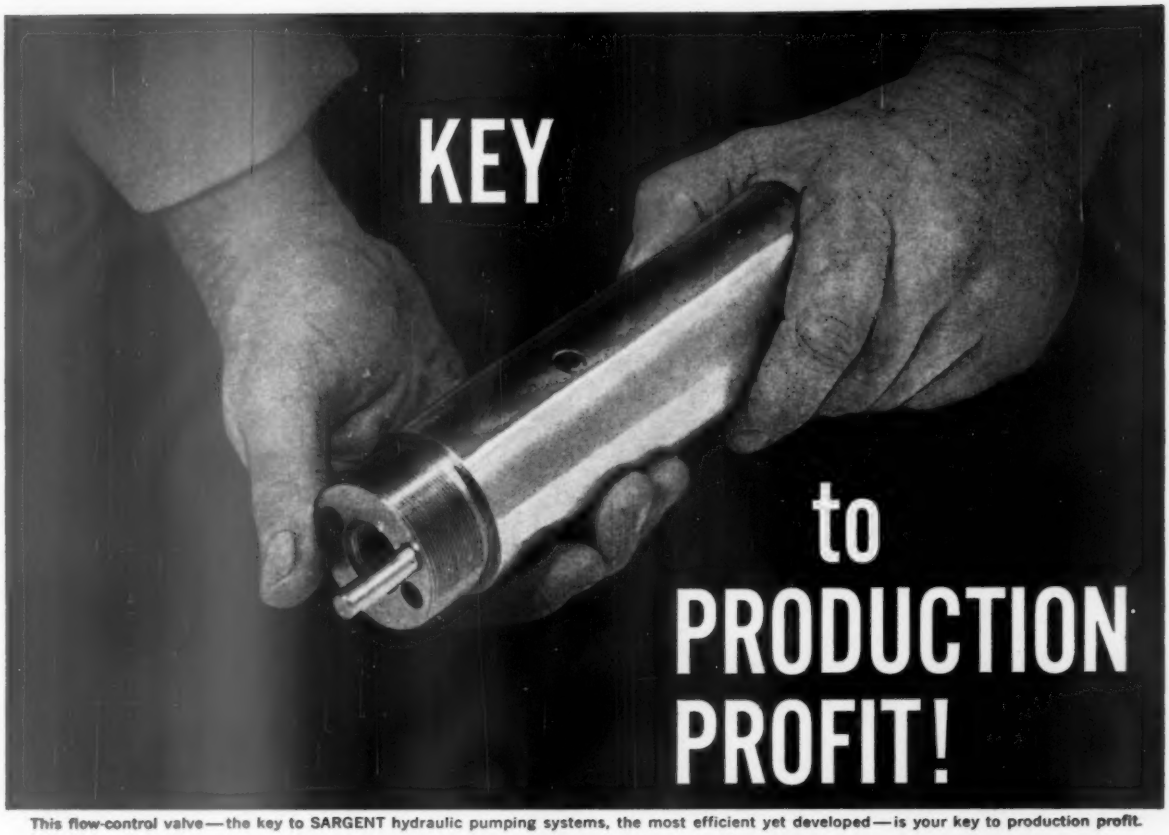
County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Allen	1	1	0	0	0	0	1,261
Ashtabula	37	1	0	32	4	0	116,329
Ashland	69	38	0	4	15	12	89,644
Athens	22	0	0	13	9	0	29,512
Belmont	5	1	0	1	3	0	8,204
Carroll	1	0	0	0	1	0	1,470
Columbiana	5	0	0	0	4	1	4,434
Coshocton	117	66	0	34	17	0	322,432
Darke	1	0	0	0	1	0	1,249
Fairfield	8	5	0	0	3	0	18,319
Gallia	1	0	0	1	0	0	1,735
Geauga	1	0	0	1	0	0	3,898
Guernsey	3	1	0	0	2	0	2,910
Hancock	2	0	0	0	2	0	2,600
Hocking	22	11	0	1	6	4	53,792
Holmes	112	65	0	19	18	10	371,819
Jackson	5	0	0	5	0	0	3,855
Jefferson	8	4	0	0	4	0	11,176
Knox	56	33	0	12	11	0	128,292
Lawrence	1	0	0	1	0	0	2,997
Licking	65	47	0	5	13	0	147,877
Logan	1	0	0	1	0	0	1,462
Lucas	1	0	0	0	1	0	1,358
Mahoning	1	0	0	1	0	0	620
Medina	52	3	0	10	2	37	168,049
Meigs	40	2	0	28	10	0	64,401
Monroe	9	2	0	2	5	0	11,344
Morgan	16	2	0	5	9	0	27,949
Muskingum	46	18	0	15	13	0	166,461
Noble	24	4	0	5	15	0	22,673
Ottawa	1	0	0	0	1	0	1,347
Perry	80	46	0	21	12	1	243,200
Portage	1	0	0	1	0	0	4,380
Richland	4	0	0	0	0	4	10,935
Ross	3	0	0	0	3	0	1,854
Stark	13	0	0	8	5	0	53,740
Summit	8	8	0	0	0	0	29,387
Tuscarawas	38	27	0	2	9	0	46,754
Vinton	24	2	0	13	2	7	61,509
Washington	41	14	0	12	15	0	55,019
Wayne	149	76	0	36	35	2	489,382
Total	1,094	477	0	289	250	78	2,785,629

OKLAHOMA
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Alfalfa	13	4	0	1	8	72,564
Atoka	4	0	0	0	4	5,243
Beaver	53	10	7	20	16	441,921
Beckham	11	1	0	1	9	63,252
Blaine	2	0	0	1	1	20,017
Bryan	4	0	0	0	4	26,717
Caddo	14	1	0	0	13	96,702
Canadian	1	0	0	0	1	8,500
Carter	9	2	1	0	6	76,589
Choctaw	1	0	0	0	1	1,200
Cimarron	21	2	0	4	15	114,138
Cleveland	23	4	0	0	19	176,788
Coal	5	0	0	0	5	37,739
Comanche	9	0	1	0	8	35,507
Cotton	12	0	0	1	11	32,350
Craig	8	0	0	0	8	6,402
Creek	5	1	0	0	4	16,168
Custer	3	0	0	2	1	46,595
Dewey	10	0	3	2	5	113,199
Ellis	20	2	1	5	12	182,053
Garfield	10	2	0	0	8	58,317
Garvin	7	1	0	0	6	36,079
Grady	5	1	0	0	4	38,872
Grant	18	3	0	3	12	90,377
Greer	17	0	0	4	13	29,614
Harmon	1	0	0	0	1	7,088
Harper	23	3	1	4	15	161,441
Haskell	2	0	0	0	2	8,731
Hughes	7	0	0	1	6	21,899
Jackson	5	0	0	0	5	16,951
Jefferson	15	0	0	0	15	32,550
Johnston	2	0	0	0	2	19,209
Kay	22	3	0	1	18	84,556
Kingfisher	7	5	0	0	2	53,627
Kiowa	98	2	0	0	96	71,275
Lincoln	19	3	0	0	16	74,573
Logan	13	2	0	1	10	68,390
Love	12	2	0	0	10	53,656
McClain	23	11	0	0	12	243,596
McCurtain	4	0	0	0	4	4,917
McIntosh	13	0	0	1	12	36,856
Major	11	2	3	0	6	81,228
Marshall	3	0	0	0	3	17,320
Mayes	1	0	0	0	1	1,685
Murray	14	2	0	0	12	35,931
Muskogee	7	0	0	0	7	14,801
Noble	15	3	0	0	12	62,287
Nowata	1	0	0	0	1	1,331
Okfuskee	8	1	1	1	5	31,691
Oklahoma	10	2	0	0	8	62,210
Okmulgee	1	0	0	1	0	2,357
Osage	49	3	0	0	46	143,505
Pawnee	9	1	0	0	8	33,004
Payne	8	0	0	0	8	37,940
Pittsburg	5	0	0	2	3	24,705
Pontotoc	5	0	0	0	5	10,040
Pottawatomie	15	5	0	1	9	85,911
Roger Mills	1	0	0	0	1	620
Seminole	7	0	0	0	7	27,533
Sequoyah	4	0	0	0	4	10,755
Stephens	15	3	0	0	12	70,915
Texas	44	10	1	12	21	307,914
Tillman	15	0	0	0	15	45,307
Wagoner	1	0	0	0	1	1,851
Washita	2	0	0	0	2	18,578
Woods	11	0	1	1	9	65,820
Woodward	14	0	0	3	11	114,670
Total	827	97	20	73	637	4,096,127

OKLAHOMA
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Service	Footage
Alfalfa	74	49	3	9	13	0	382,090
Beaver	208	41	22	97	48	0	1,444,574
Beckham	7	4	0	1	2	0	34,788
Blaine	2	0	1	1	0	0	16,057
Bryan	5	1	0	2	2	0	30,221
Caddo	98	86	0	2	10	0	308,267
Carter	170	136	0	0	33	1	576,134
Cimarron	25	2	1	7	15	0	114,012
Cleveland	73	49	2	1	19	2	572,304
Coal	9	3	2	1	3	0	36,273
Comanche	65	32	0	0	33	0	88,245
Cotton	35	21	0	0	14	0	74,356
Creek	305	191	0	3	98	13	763,757
Dewey	1	0	1	0	0	0	11,851
Ellis	7	2	2	2	1	0	59,060
Garfield	49	27	1	1	19	1	172,356
Garvin	125	76	4	5	39	1	700,918
Grady	13	5	1	1	6	0	97,551
Grant	57	29	2	7	19	0	277,088
Greer	14	0	0	2	12	0	15,452
Harper	108	19	11	65	12	1	716,362
Haskell	3	0	0	2	1	0	15,821
Hughes	75	36	0	15	24	0	180,582
Jackson	2	0	0	0	1	1	2,950
Jefferson	40	21	0	2	17	0	66,850
Kay	121	76	0	1	40	4	439,382
Kingfisher	13	11	1	1	0	0	91,600
Kiowa	265	106	0	0	157	2	162,912
Le Flore	1	0	0	0	1	0	2,915
Lincoln	119	60	1	13	42	3	492,498
Logan	42	25	1	2	13	1	237,937
Love	30	13	4	0	13	0	161,216
McClain	147	123	4	1	19	0	1,322,785
McCurtain	3	0	0	0	3	0	1,437
McIntosh	9	0	0	3	6	0	21,891
Major	20	10	4	0	6	0	148,362
Marshall	55	39	0	0	16	0	210,664
Murray	17	8	0	0	9	0	89,021
Muskogee	43	26	0	0	17	0	86,171
Noble	104	59	0	1	43	1	417,652
Okfuskee	158	105	0	7	43	3	501,683
Oklahoma	30	13	3	5	9	0	172,792
Okmulgee	294	159	0	5	88	42	542,871
Osage	558	356	0	1	170	31	1,223,647
Pawnee	77	55	0	0	21	1	182,844



This flow-control valve—the key to SARGENT hydraulic pumping systems, the most efficient yet developed—is your key to production profit.

PROFIT = PRODUCTION – (Installation & Maintenance)

When SARGENT took the long stroke unit from the TOP of the hole and placed it at the BOTTOM to operate the time-proved standard bottom-hole pump, things happened!

WITH THE SARGENT FREE TYPE PUMP:

1. Sucker rods are eliminated, along with the cost of rod replacement and tubing wear.
2. Maintenance costs drop. No longer a need for costly crew time or expensive pulling equipment.
3. Maximum effective long, bottom-hole stroke is made possible by the exclusive SARGENT design which provides positive plunger travel with pre-set valve spacing.
4. Unrestricted application because the pump can be used on any well or on more than one well in group operations.
5. This pump has been operated on oil, salt water or fresh water as power fluid.

UNDER THE TOUGHEST FIELD CONDITIONS

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"Missile Quality" represents the uncompromising excellence of product engineering and manufacture where "almost perfect" is not good enough. Years of experience in the design and production of missile, aircraft and marine components enables SARGENT to produce "missile quality" A.P.I. classified pumps in advanced metals and designs to meet any well condition – your assurance of better pump performance.

If you are interested in "production for profit" use SARGENT.
Talk to your SARGENT Representative and learn how profits can be boosted by lowered "Installation-Maintenance" costs.

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1959 WILDCAT AND FIELD DRILLING

OKLAHOMA (Continued)

County—	Total	Crude	Cond.	Gas	Dry		Footage
Payne	59	26	0	0	31	2	218,898
Pittsburg	4	0	0	1	3	0	8,746
Pontotoc	77	45	0	3	29	0	140,098
Pottawatomie	78	54	0	0	24	0	345,732
Seminole	247	161	0	8	77	1	754,386
Stephens	241	156	3	7	75	0	665,652
Texas	98	33	6	30	19	1	517,653
Tillman	38	25	0	0	13	0	148,584
Wagoner	1	0	0	0	1	0	2,310
Washington	4	4	0	0	0	0	4,662
Washita	2	1	1	0	0	0	14,449
Woods	8	0	2	3	3	0	46,609
Woodward	8	1	3	1	3	0	63,466
Total	4,532	2,580	86	319	1,435	112	16,199,444

SOUTH DAKOTA
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Custer	1	0	0	0	1	1,455
Fall River	1	0	0	0	1	1,650
Harding	7	1	0	0	6	59,778
Lincoln	1	0	0	0	1	722
Total	10	1	0	0	9	63,605

SOUTH DAKOTA
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Harding	13	12	0	0	1	0	111,593
Total	13	12	0	0	1	0	111,593

TEXAS
District 1
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Atascosa	22	0	0	0	22	79,292
Bastrop	16	0	0	0	16	44,172
Bell	4	0	0	0	4	2,169
Bexar	10	0	0	0	10	14,392
Caldwell	9	0	0	0	9	23,603
Dimmit	14	4	0	1	9	69,907
Edwards	5	0	0	0	5	15,867
Frio	8	0	0	0	8	27,425
Gonzales	15	0	0	0	15	56,604
Guadalupe	11	0	0	0	11	17,698
Hays	1	0	0	0	1	731
Kerr	1	0	0	0	1	4,511
Kimble	2	0	0	0	2	5,235
LaSalle	13	0	0	0	13	78,546
Lee	1	0	0	0	1	4,804
Maverick	25	2	0	0	23	36,406
McMullen	37	0	0	0	37	110,486
Medina	15	0	0	0	15	20,270
Menard	7	0	0	0	7	25,164
Milam	8	0	0	0	8	40,306
Travis	17	0	0	0	17	15,772
Val Verde	5	0	0	0	5	42,240
Williamson	13	0	0	0	13	18,339
Wilson	26	0	0	0	26	53,390
Zavala	44	0	0	1	43	205,340
Total	329	6	0	2	321	1,012,669

TEXAS
District 1
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Atascosa	33	16	6	3	8	0	162,775
Bastrop	4	1	0	0	2	1	16,883
Bexar	117	97	0	0	20	0	140,744
Caldwell	110	93	0	0	17	0	257,343
Dimmit	54	29	0	7	18	0	185,279
Frio	19	6	0	7	6	0	60,427
Gonzales	5	0	0	0	5	0	12,580
Guadalupe	53	49	0	0	4	0	110,903
Kimble	1	0	0	0	1	0	900

County—	Total	Crude	Cond.	Gas	Dry	Service	Footage
LaSalle	32	16	0	3	13	0	175,352
Maverick	75	56	1	0	18	0	126,408
McMullen	66	36	6	8	16	0	268,327
Medina	75	71	0	1	3	0	70,899
Menard	2	1	0	0	1	0	6,002
Milam	8	8	0	0	0	0	3,325
Travis	14	3	0	0	11	0	11,618
Val Verde	5	3	1	0	1	0	13,023
Williamson	3	2	0	0	1	0	4,535
Wilson	63	24	0	1	38	0	128,262
Zavala	9	1	0	3	5	0	30,167
Total	748	512	14	33	188	1	1,785,752

TEXAS
District 2
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Bee	37	1	0	2	34	197,581
Calhoun	23	1	2	1	19	207,197
DeWitt	11	0	1	0	10	97,727
Goliad	19	1	0	2	16	118,545
Jackson	24	3	1	4	16	166,411
Karnes	13	0	0	0	13	116,188
Lavaca	12	1	1	1	9	111,645
Live Oak	46	3	1	1	41	228,450
Refugio	23	3	1	1	18	153,023
Victoria	24	0	2	2	20	140,834
Total	232	13	9	14	196	1,537,601

TEXAS
District 2
Development Completions by Counties

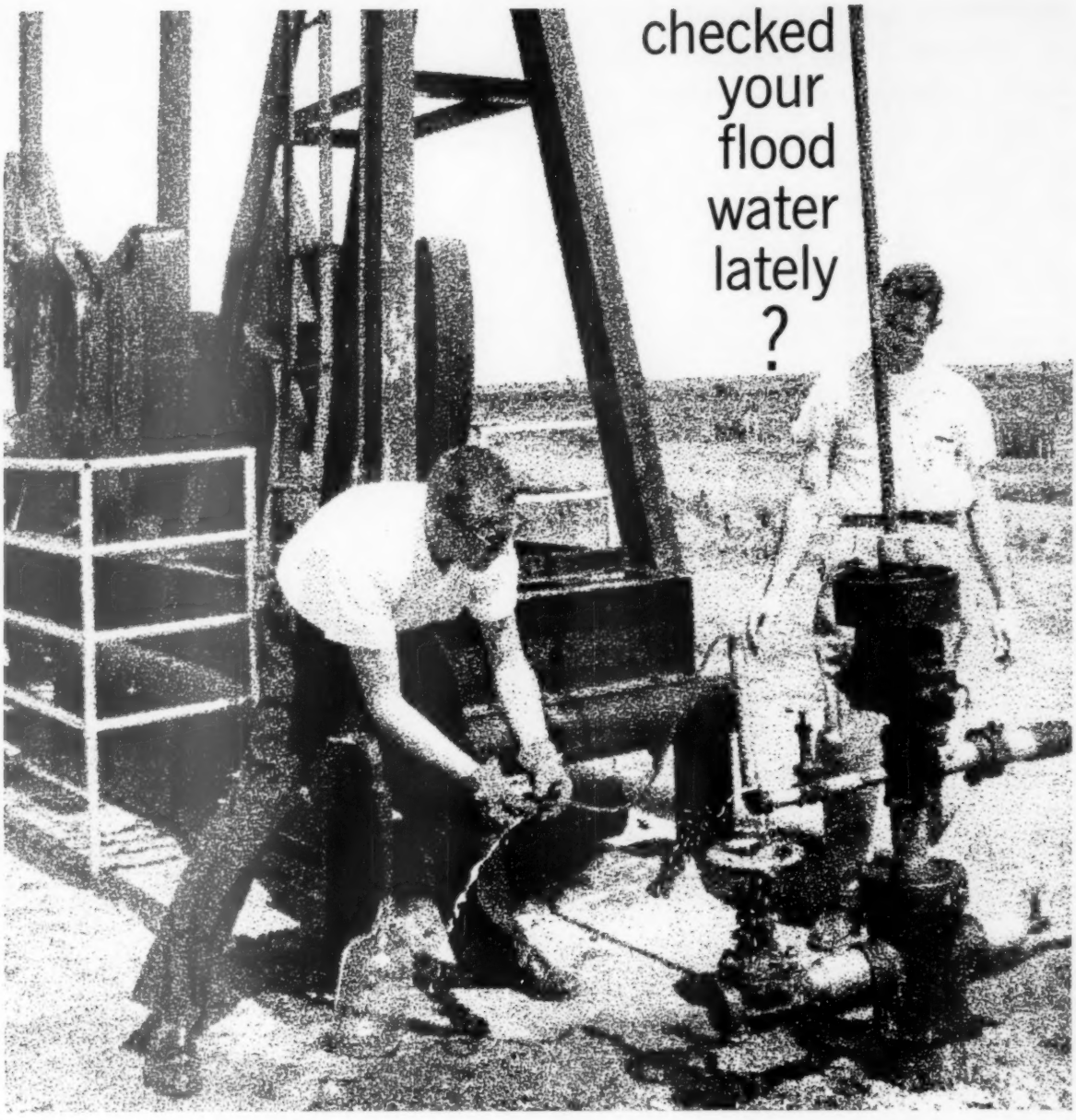
County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Bee	54	5	9	14	26	0	298,466
Calhoun	35	8	12	2	13	0	300,978
DeWitt	28	3	12	5	8	0	206,087
Goliad	46	2	12	12	20	0	293,311
Jackson	104	28	24	21	31	0	648,003
Karnes	24	20	0	0	4	0	162,128
Lavaca	17	0	11	1	5	0	146,890
Live Oak	113	49	17	7	40	0	584,198
Refugio	92	51	3	23	14	1	502,730
Victoria	51	17	6	9	19	0	267,558
Total	564	183	106	94	180	1	3,410,349

TEXAS
District 3
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Austin	1	0	1	0	0	10,600
Brazoria	19	0	1	0	18	184,401
Brazos	2	0	0	0	2	14,334
Chambers	22	0	1	0	21	187,605
Colorado	9	0	0	2	7	82,225
Fayette	9	0	0	0	9	31,470
Fort Bend	13	1	0	0	12	100,608
Galveston	10	0	4	0	6	116,964
Grimes	2	0	0	0	2	6,393
Hardin	13	1	2	0	10	117,634
Harris	19	2	0	0	17	145,723
Jasper	6	1	0	0	5	50,845
Jefferson	16	1	2	0	13	151,536
Liberty	23	0	2	0	21	180,801
Matagorda	29	1	9	0	19	272,054
Montgomery	2	0	0	0	2	15,773
Newton	11	0	1	0	10	99,860
Orange	9	0	0	0	9	79,035
Polk	3	0	0	0	3	20,643
San Jacinto	3	0	0	0	3	23,960
Tyler	3	0	0	0	3	26,212
Walker	2	0	0	0	2	8,611
Waller	1	0	0	0	1	9,510
Wharton	7	0	0	1	6	43,149
Total	234	7	23	3	201	2,039,071

TEXAS
District 3
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Austin	8	4	2	0	2	0	53,867
Brazoria	69	26	10	2	31	0	417,568



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■ Water flood operators all over the country have discovered that citric acid can prevent sandface plugging caused by iron precipitates in the injection water. This means higher injection rates, lower injection pressures, less frequent downtime on filters, less replacement of parts because of rusting.

■ With Pfizer Citric Acid there is less need for costly acidizing or fracturing operations —and remember—pound for pound, citric acid sequesters iron better and at less cost than any other agent. It is nontoxic and safe to handle too.

■ FOR STAINLESS EQUIPMENT CLEANING citric acid has a history of proven success as a safe, efficient cleaning agent—completely eliminates the possibility of chloride stress corrosion as well as reprecipitation of dissolved scale. Discuss the unique advantages of Pfizer Citric Acid with your chemical cleaning service company.

■ Write Pfizer for details on citric's applications in water flooding and chemical cleaning.

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1959 WILDCAT AND FIELD DRILLING

TEXAS District 3 (Continued)

County—	Total	Crude	Cond.	Gas	Dry	Service	Footage
Brazos	1	0	0	1	0	0	3,463
Chambers	63	32	10	1	20	0	535,574
Colorado	16	4	7	1	4	0	128,263
Fayette	4	2	0	0	2	0	7,418
Fort Bend	39	24	1	0	14	0	132,758
Galveston	94	50	14	1	29	0	823,641
Hardin	83	57	3	0	23	0	276,544
Harris	159	90	6	0	62	1	596,274
Jasper	21	16	0	0	5	0	165,997
Jefferson	79	25	33	0	21	0	665,364
Liberty	99	52	8	1	38	0	593,558
Madison	4	0	3	0	1	0	37,790
Matagorda	75	30	18	2	25	0	643,297
Montgomery	9	0	5	0	4	0	84,588
Newton	17	8	2	0	7	0	149,966
Orange	19	11	1	0	7	0	118,985
Polk	10	5	2	0	3	0	74,606
San Jacinto	4	1	2	0	1	0	32,191
Tyler	26	21	0	0	5	0	226,820
Waller	1	0	0	1	0	0	8,013
Washington	10	9	0	0	1	0	18,408
Wharton	51	12	5	12	21	1	238,419
Total	961	479	132	22	326	2	6,033,372

TEXAS
District 4
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Aransas	8	1	0	0	7	68,856
Brooks	11	1	0	1	9	96,369
Cameron	6	0	0	1	5	56,423
Duval	71	7	4	5	55	305,727
Hidalgo	25	1	0	2	22	202,679
Jim Hogg	28	0	1	0	27	143,746
Jim Wells	20	1	2	0	17	97,022
Kenedy	11	0	1	0	10	116,039
Kleberg	8	2	0	0	6	64,219
Nueces	25	2	1	0	22	160,108
San Patricio	28	2	2	0	24	185,298
Starr	36	1	0	0	35	104,716
Webb	41	3	0	1	37	223,699
Willacy	3	0	0	0	3	25,435
Zapata	35	0	1	0	34	91,536
Total	356	21	12	10	313	1,941,872

TEXAS
District 4
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Aransas	1	0	1	0	0	0	7,550
Brooks	37	17	7	2	11	0	263,554
Cameron	4	0	0	2	2	0	37,522
Duval	239	130	14	26	66	3	868,036
Hidalgo	96	13	44	17	22	0	744,952
Jim Hogg	50	25	1	7	17	0	182,989
Jim Wells	96	34	13	18	31	0	508,380
Kenedy	6	0	2	1	3	0	63,697
Kleberg	41	23	4	9	5	0	367,779
Nueces	71	26	5	5	33	2	431,665
San Patricio	112	31	11	39	30	1	632,844
Starr	122	58	21	11	32	0	564,626
Webb	69	18	5	7	38	1	247,007
Zapata	42	3	5	7	19	8	139,129
Total	986	378	133	151	309	15	5,059,730

EAST TEXAS
Districts 5 and 6
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Anderson	39	0	0	0	39	201,009
Angelina	1	0	0	0	1	2,683
Bowie	4	0	0	0	4	33,077
Camp	1	0	0	0	1	4,260
Cass	8	2	0	0	6	67,329
Cherokee	16	0	0	0	16	80,438
Collin	3	0	0	0	3	14,476
Ellis	4	0	0	0	4	5,132
Falls	4	0	0	0	4	19,428
Franklin	4	0	0	0	4	17,203
Freestone	15	1	0	0	14	94,597
Gregg	2	0	0	0	2	11,226
Harrison	5	0	0	0	5	34,919
Henderson	11	0	0	0	11	73,041
Hill	7	1	0	0	6	11,289
Hopkins	4	0	0	0	4	25,228
Houston	10	0	1	0	9	66,572
Kaufman	5	0	0	0	5	15,076
Leon	11	0	0	0	11	62,783
Limestone	3	0	0	0	3	11,635
Marion	6	1	0	0	5	38,769
McLennan	1	0	0	0	1	390
Morris	1	0	0	0	1	5,460
Navarro	8	0	0	0	8	18,706
Red River	13	0	0	0	13	33,657
Robertson	4	0	0	0	4	15,960
Rusk	11	0	1	0	10	78,738
Shelby	9	1	0	0	8	48,603
Smith	15	0	0	0	15	86,284
Titus	9	2	0	0	7	49,279
Upshur	6	0	0	0	0	34,204
Van Zandt	6	0	0	0	6	24,913
Wood	6	0	0	0	0	40,032
Totals	252	8	2	0	242	1,326,396

EAST TEXAS
Districts 5 and 6
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Service	Footage
Anderson	53	17	8	2	26	0	314,494
Angelina	1	0	0	0	1	0	2,329
Camp	7	4	0	0	3	0	30,074
Cass	49	39	1	1	8	0	306,398
Cherokee	23	7	6	0	10	0	128,125
Ellis	110	109	0	0	1	0	64,261
Falls	6	2	0	0	4	0	7,888
Franklin	3	1	1	0	1	0	32,204
Freestone	29	13	3	1	12	0	127,677
Gregg	44	35	5	0	4	0	182,910
Harrison	137	114	13	0	9	1	614,233
Henderson	11	3	2	0	6	0	56,463
Hill	8	0	0	0	8	0	8,771
Hopkins	2	1	0	0	0	1	6,592
Houston	11	3	5	2	1	0	68,340
Hunt	1	0	0	0	1	0	2,931
Kaufman	2	1	0	0	1	0	8,800
Lamar	1	0	0	0	1	0	1,817
Leon	21	2	10	1	8	0	128,451
Limestone	10	1	5	0	4	0	47,506
Marion	21	16	1	0	4	0	125,932
McLennan	1	1	0	0	0	0	470
Nacogdoches	5	2	1	0	1	1	12,703
Navarro	124	115	0	0	9	0	117,409
Panola	23	9	6	1	7	0	119,371
Red River	10	3	0	0	7	0	25,550
Robertson	6	0	2	3	1	0	20,190
Rusk	95	75	10	0	10	0	433,734
Shelby	9	2	1	0	6	0	35,944
Smith	72	59	4	0	9	0	599,618
Talco	1	1	0	0	0	0	4,310
Titus	38	28	0	0	10	0	160,235
Upshur	23	21	0	0	2	0	86,574
Van Zandt	5	1	1	0	3	0	27,805
Wood	32	22	0	0	9	1	223,125
Total	994	707	85	11	187	4	4,093,234

WEST CENTRAL TEXAS
District 7-B
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Bosque	2	0	0	0	2	742
Brown	21	1	0	3	17	34,478
Callahan	53	5	0	0	48	109,865
Coleman	47	3	0	0	44	122,268
Comanche	6	1	0	1	4	13,823
Coryell	1	0	0	0	1	1,220
Eastland	5	0	0	2	3	17,083
Fisher	29	0	0	1	28	160,655

LIBYA

Dynamite for shot-firing being carried across country by camel train. BP Exploration Company (Libya) Limited is now searching for oil over six concession areas in Tripolitania, Cyrenaica and the Fezzan.

BP

1959 WILDCAT AND FIELD DRILLING

WEST CENTRAL TEXAS District 7-B (Continued)

County—	Total	Crude	Cond.	Gas	Dry	Service	Footage
Hamilton	1	0	0	0	1		2,840
Haskell	61	3	0	0	58		258,838
Johnson	1	0	0	0	1		3,900
Jones	105	9	0	0	96		320,822
Mills	2	0	0	0	2		7,060
Nolan	21	2	0	0	19		111,125
Palo Pinto	34	2	2	5	25		133,347
Parker	19	1	2	3	13		80,119
Shackelford	72	6	0	1	65		146,471
Stephens	21	2	1	0	18		81,983
Stonewall	35	6	0	0	29		179,549
Taylor	117	17	0	0	100		348,450
Throckmorton	41	8	0	1	32		163,943
Total	694	66	5	17	606		2,298,581

WEST CENTRAL TEXAS
District 7-B
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Brown	123	90	0	6	25	2	185,649
Callahan	157	72	0	1	80	4	180,577
Coleman	181	120	1	4	47	9	441,766
Comanche	7	2	0	2	3	0	15,304
Eastland	44	25	1	0	10	8	101,409
Erath	3	0	1	2	0	0	10,797
Fisher	55	42	0	1	12	0	255,633
Hamilton	1	0	1	0	0	0	3,315
Haskell	146	107	0	0	38	1	679,211
Jones	164	96	0	0	65	3	468,722
Nolan	49	30	1	0	18	0	280,919
Palo Pinto	56	24	4	11	16	1	171,981
Parker	30	9	2	8	11	0	113,639
Shackelford	313	186	0	1	117	9	422,807
Stephens	76	47	1	5	22	1	244,489
Stonewall	70	38	0	0	32	0	280,235
Taylor	355	224	0	0	127	4	1,103,832
Throckmorton	99	62	0	1	33	3	351,728
Total	1,929	1,174	12	42	656	45	5,312,013

WEST TEXAS
Districts 7-C and 8
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Andrews	5	0	0	0	5	52,837
Bailey	2	0	0	0	2	8,895
Borden	23	4	0	0	19	175,284
Brewster	4	0	0	0	4	9,941
Cochran	9	0	0	0	9	52,595
Coke	20	2	0	0	18	113,163
Concho	12	0	1	0	11	34,031
Cottle	5	0	0	0	5	19,528
Crane	11	0	0	0	11	59,574
Crockett	28	3	0	2	23	120,612
Crosby	3	1	0	0	2	14,716
Culberson	31	0	0	0	31	91,327
Dawson	6	1	0	0	5	63,798
Dickens	4	0	0	0	4	12,028
Ector	8	0	0	0	8	51,008
Gaines	25	6	0	1	18	195,536
Garza	22	4	0	0	18	166,028
Glasscock	8	1	0	0	7	47,585
Hale	1	0	0	0	1	11,600
Hockley	14	1	0	0	13	87,334
Howard	12	2	0	0	10	83,843
Irion	21	3	0	0	18	51,667
Jeff Davis	1	0	0	0	1	2,377
Kent	7	0	0	0	7	46,099
King	26	0	0	0	26	107,518
Lamb	8	0	0	0	8	43,440
Loving	47	1	0	0	46	196,068
Lubbock	5	0	0	0	5	27,352
Lynn	9	1	0	0	8	47,282
Martin	15	2	0	0	13	135,259
McCulloch	8	0	0	1	7	10,495
Midland	2	0	0	0	2	23,536
Mitchell	1	0	0	0	1	7,740
Motley	6	0	0	0	6	41,693
Pecos	68	1	3	1	63	378,570
Reagan	4	1	0	0	3	22,902
Reeves	54	2	0	0	52	213,985
Runnels	65	5	0	1	59	262,520
Schleicher	24	1	2	2	19	127,914
Scurry	8	1	0	0	7	50,976
Sterling	8	1	0	0	7	36,609
Sutton	10	1	0	0	9	52,031
Terrell	11	0	0	0	11	89,064
Terry	5	0	0	0	5	50,241
Tom Green	19	1	0	0	18	100,811
Upton	8	0	0	0	8	42,638
Ward	15	1	0	0	14	95,448
Winkler	14	1	0	0	13	97,367
Yoakum	25	2	0	0	23	153,546
Total	747	50	6	8	683	3,986,411

WEST TEXAS
Districts 7-C and 8
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Service	Footage
Andrews	607	551	0	1	55	0	4,323,796
Borden	81	64	0	0	17	0	575,202
Cochran	82	77	0	0	5	0	347,596
Coke	27	23	0	0	4	0	192,899
Concho	2	0	0	0	2	0	2,927
Crane	386	364	0	1	21	0	1,703,405
Crockett	106	83	2	3	18	0	229,884
Crosby	9	5	0	0	4	0	34,082
Culberson	46	39	0	2	5	0	117,267
Dawson	33	29	0	0	4	0	227,001
Dickens	1	1	0	0	0	0	4,565
Ector	535	506	0	1	27	1	3,123,984
Gaines	193	168	0	5	20	0	1,302,203
Garza	135	111	0	0	24	0	481,444
Glasscock	5	4	0	0	1	0	36,090
Hockley	49	42	0	0	6	1	270,298
Howard	159	148	0	0	11	0	590,840
Irion	41	27	0	0	14	0	103,591
Kent	35	24	0	0	11	0	213,986
King	12	8	0	1	3	0	38,689
Lamb	9	8	0	0	0	1	34,273
Loving	101	88	0	0	13	0	467,155
Lubbock	1	1	0	0	0	0	5,269
Lynn	25	16	0	0	9	0	106,812
Martin	16	14	0	0	2	0	134,686
McCulloch	3	1	0	1	1	0	4,352
Midland	80	66	11	1	2	0	707,349
Mitchell	89	86	0	0	3	0	195,120
Motley	14	8	0	4	2	0	46,506
Pecos	248	162	7	21	39	19	824,589
Reagan	44	39	0	0	5	0	282,284
Reeves	169	142	0	1	26	0	417,370
Runnels	93	63	2	2	25	1	360,726
Schleicher	38	19	3	1	15	0	197,885
Scurry	180	161	0	0	19	0	679,802
Sterling	32	21	0	1	10	0	111,635
Sutton	8	1	2	4	1	0	52,263
Terrell	6	1	0	3	2	0	68,867
Terry	25	21	0	0	4	0	149,270
Tom Green	24	11	1	1	11	0	83,236
Upton	131	121	2	0	8	0	734,365
Ward	346	268	6	1	38	33	995,269
Winkler	384	272	18	5	30	59	1,738,325
Yoakum	137	121	0	0	16	0	833,999
Total	4,747	3,985	54	60	533	115	23,151,156

NORTH TEXAS
District 9
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Archer	58	11	0	0	47	228,499
Baylor	60	1	0	0	59	107,187
Clay	35	5	0	0	30	143,829
Cooke	87	8	0	0	79	326,877
Denton	6	0	0	0	6	15,327
Foard	12	2	0	0	10	69,246
Grayson	15	2	0	0	13	75,049
Hardeman	7	1	0	0	6	55,648
Jack	47	6	0	3	38	183,945
Knox	65	3	0	0	62	191,079
Montague	27	4	0	0	23	137,297

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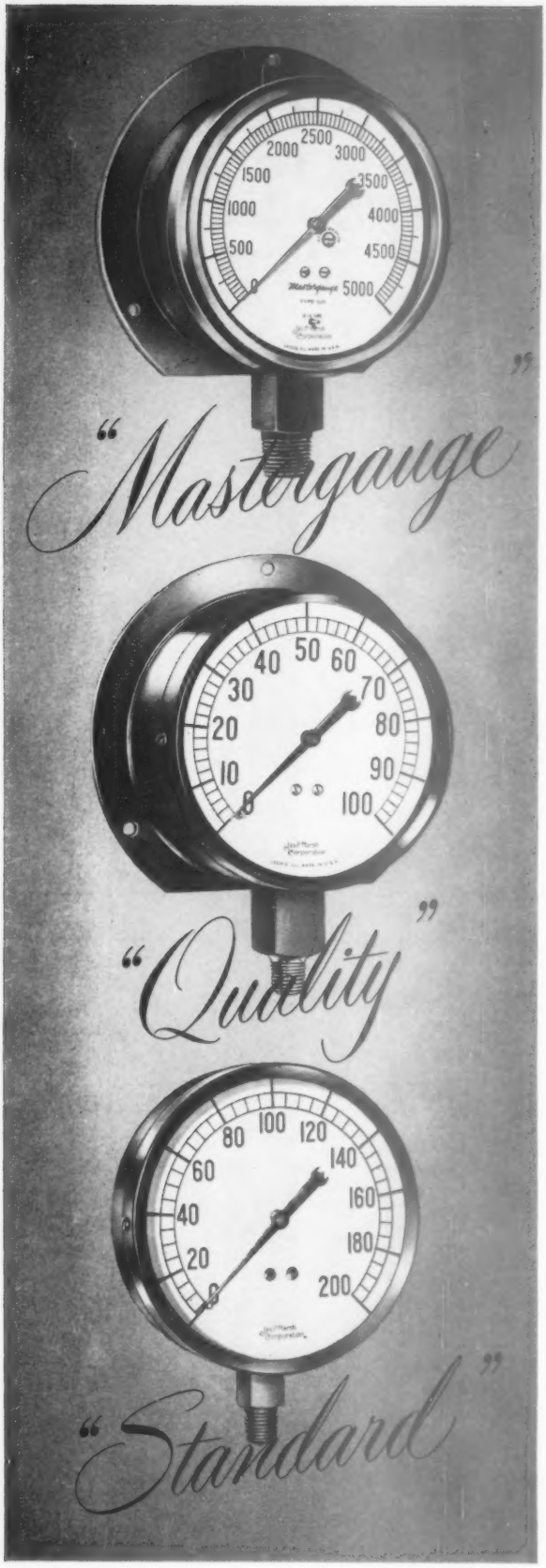

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"THE STANDARD OF ACCURACY"

1959 WILDCAT AND FIELD DRILLING

NORTH TEXAS District 9 (Continued)

County—	Total	Crude	Cond.	Gas	Dry	Footage
Wichita	13	2	0	0	11	46,690
Wilbarger	52	1	0	0	51	222,225
Wise	9	1	0	0	8	33,464
Young	80	11	0	1	68	300,400
Total	573	58	0	4	511	2,136,762

NORTH TEXAS
District 9
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Archer	398	263	0	0	109	26	766,084
Baylor	185	116	0	0	63	6	291,609
Clay	119	75	0	0	34	10	293,967
Cooke	288	178	0	1	93	16	736,004
Denton	6	1	0	0	5	0	10,465
Foard	30	20	0	2	8	0	161,880
Grayson	31	24	1	0	6	0	194,030
Hardeman	2	0	0	0	2	0	16,218
Jack	231	127	2	24	54	24	756,777
Knox	191	115	0	0	75	1	416,718
Montague	140	105	0	1	24	10	305,378
Wichita	496	338	0	0	122	36	866,732
Wilbarger	260	145	0	0	60	55	667,441
Wise	204	98	13	67	22	4	1,112,595
Young	329	190	0	14	103	22	857,617
Total	2,910	1,795	16	109	780	210	7,453,515

TEXAS PANHANDLE
District 10
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Armstrong	1	0	0	0	1	4,705
Briscoe	3	0	0	0	3	21,819
Carson	6	2	0	0	4	34,408
Castro	2	0	0	0	2	18,954
Childress	3	0	0	0	3	12,016
Collingsworth	1	0	0	0	1	6,500
Dallam	3	0	0	0	3	13,327
Deaf Smith	2	0	0	0	2	16,215
Donley	3	0	0	0	3	16,759
Gray	5	1	0	0	4	19,281
Hall	2	0	0	0	2	13,256
Hansford	10	0	4	0	6	72,123
Hartley	2	0	0	0	2	11,928
Hemphill	6	1	0	0	5	37,135
Hutchinson	10	0	0	0	10	57,884
Lipscomb	10	1	1	0	8	81,438
Moore	1	0	0	0	1	7,790
Ochiltree	8	4	1	0	3	64,556
Oldham	7	0	0	0	7	46,702
Potter	1	0	0	0	1	6,803
Randall	4	0	0	0	4	34,234
Roberts	14	0	1	0	13	77,695
Sherman	2	0	0	1	1	7,145
Wheeler	2	0	0	0	2	7,248
Total	108	9	7	1	91	689,921

TEXAS PANHANDLE
District 10
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Carson	165	137	0	9	17	2	530,327
Collingsworth	48	0	0	40	8	0	105,767
Dallam	9	0	0	3	6	0	30,275
Donley	1	0	0	0	1	0	2,758
Gray	150	85	0	60	3	2	430,610
Hansford	82	19	30	10	23	0	566,326
Hemphill	3	1	1	0	1	0	34,430
Hutchinson	347	324	0	8	12	3	1,094,808
Lipscomb	24	13	5	1	5	0	202,351
Moore	33	13	1	12	4	3	107,430
Ochiltree	170	114	28	9	19	0	1,349,178
Oldham	1	0	0	0	1	0	7,166
Potter	4	0	0	4	0	0	11,714
Roberts	25	7	6	8	4	0	161,456
Sherman	28	2	0	13	13	0	89,619
Wheeler	72	38	0	21	13	0	148,994
Total	1,162	753	71	198	130	10	4,873,209

UTAH
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Cache	1	0	0	1	0	200
Carbon	6	0	0	1	5	34,742
Duchesne	3	2	0	0	1	27,639
Emery	9	0	0	0	9	51,975
Garfield	3	0	0	0	3	14,852
Grand	8	0	0	1	7	20,885
Salt Lake	1	0	0	0	1	565
San Juan	43	4	0	1	38	256,218
Summit	1	0	0	0	1	1,675
Uintah	13	1	0	3	9	73,701
Utah	1	0	0	0	1	6,880
Washington	2	0	0	0	2	4,481
Wayne	10	0	0	0	10	58,374
Total	101	7	0	7	87	552,187

UTAH
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Duchesne	2	1	0	0	1	0	5,455
Grand	8	0	0	5	3	0	11,163
San Juan	178	154	0	0	24	0	1,008,380
Uintah	27	19	0	4	4	0	158,838
Washington	2	2	0	0	0	0	1,528
Total	217	176	0	9	32	0	1,185,364

WEST VIRGINIA
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Jackson	8	0	0	8	0	37,923
Kanawha	4	0	0	3	1	13,572
Lewis	1	0	0	1	0	1,523
Mason	1	0	0	0	1	8,635
Nicholas	3	0	0	2	1	5,682
Pocahontas	6	0	0	4	2	39,564
Randolph	3	0	0	2	1	18,998
Tucker	2	0	0	2	0	9,655
Wetzel	1	0	0	1	0	7,694
Total	29	0	0	23	6	143,246

WEST VIRGINIA
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Barbour	5	0	0	4	1	0	21,592
Boone	2	1	0	1	0	0	5,526
Braxton	14	0	0	12	2	0	26,515
Cabell	3	0	0	3	0	0	8,970
Calhoun	99	23	0	71	5	0	197,947
Clay	12	2	0	8	2	0	21,983
Doddridge	18	1	0	13	4	0	36,195
Fayette	2	0	0	1	1	0	3,867
Gilmer	39	0	0	31	7	1	76,071
Harrison	4	0	0	2	2	0	4,645
Jackson	14	4	0	8	2	0	39,651
Kanawha	10	0	0	9	1	0	26,600
Lewis	45	0	0	39	3	3	121,248
Lincoln	6	2	0	2	2	0	13,907
Logan	34	6	0	24	4	0	103,296
McDowell	5	0	0	5	0	0	23,611
Marshall	25	0	0	0	1	24	67,708
Mason	2	0	0	0	2	0	2,229
Mingo	36	0	0	30	6	0	127,500
Monongalia	6	0	0	5	1	0	7,645
Nicholas	14	1	0	5	8	0	29,594
Pleasants	16	10	0	3	2	1	31,168
Preston	9	0	0	0	0	9	48,398
Putnam	10	0	0	10	0	0	41,762
Raleigh	7	0	0	5	2	0	21,838
Randolph	2	0	0	2	0	0	12,750
Ritchie	141	21	0	90	30	0	276,176
Roane	21	7	0	11	3	0	42,790
Tucker	1	0	0	1	0	0	4,518

1959 WILDCAT AND FIELD DRILLING

WEST VIRGINIA (Continued)

County—	Total	Crude	Cond.	Gas		Dry	Footage
Tyler	7	0	0	3	3	1	15,899
Upshur	29	0	0	29	0	0	123,358
Wayne	92	5	0	73	14	0	219,024
Wetzel	4	0	0	2	2	0	10,012
Wirt	17	7	0	10	0	0	35,266
Wood	6	3	0	0	3	0	10,704
Wyoming	20	0	0	15	5	0	57,569
Total	777	93	0	527	118	39	1,917,532

WYOMING
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Albany	5	0	0	0	5	18,256
Big Horn	13	0	0	0	13	36,571
Campbell	36	2	0	0	34	274,760
Carbon	18	0	0	2	16	100,045
Converse	4	0	1	0	3	27,268
Crook	35	4	0	0	31	157,880
Fremont	29	1	0	2	26	158,109
Goshen	2	0	0	0	2	8,466
Hot Springs	11	0	0	0	11	55,125
Johnson	12	3	0	0	9	59,812
Laramie	9	0	0	0	9	66,580
Lincoln	17	1	0	4	12	131,281
Natrona	30	2	0	1	27	133,332
Niobrara	17	2	0	0	15	81,263
Park	11	1	0	0	10	54,760
Platte	7	0	0	0	7	11,335
Sheridan	4	0	0	0	4	32,056
Sublette	20	0	0	7	13	125,105
Sweetwater	42	3	0	5	34	299,395
Teton	2	0	0	0	2	4,708
Uinta	4	0	0	0	4	16,240
Washakie	7	0	0	0	7	47,149
Weston	40	2	0	0	38	232,607
Total	375	21	1	21	332	2,132,103

WYOMING
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Serv.	Footage
Big Horn	26	18	0	0	8	0	107,114
Campbell	20	15	0	0	5	0	141,422
Carbon	19	10	0	1	8	0	78,943
Converse	17	14	0	0	3	0	78,184
Crook	71	52	0	0	19	0	362,350
Fremont	25	14	0	0	11	0	95,036
Hot Springs	40	31	0	0	0	9	138,755
Johnson	44	30	0	0	9	5	263,987
Laramie	1	0	0	0	1	0	7,750
Lincoln	11	0	0	8	3	0	76,836
Natrona	57	28	2	2	25	0	209,907
Niobrara	14	1	0	1	12	0	44,526
Park	47	36	0	3	7	1	224,918
Sublette	64	22	0	32	10	0	318,007
Sweetwater	15	4	0	6	5	0	93,985
Washakie	13	8	0	0	5	0	65,655
Weston	131	67	0	0	38	26	459,347
Total	615	350	2	53	169	41	2,766,722

MICHIGAN
Development Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Allegan	124	7	0	34	83	324,834
Arenac	10	7	0	0	3	42,070
Barry	4	3	0	0	1	6,040
Bay	1	1	0	0	0	2,834
Calhoun	37	26	0	1	10	159,826
Clare	1	1	0	0	0	5,175
Genesee	1	1	0	0	0	1,510
Gladwin	18	13	0	0	5	65,513
Gratiat	9	6	0	0	3	25,605
Hillsdale	56	36	0	1	19	223,362
Huron	1	1	0	0	0	3,415
Isabella	4	1	0	0	3	12,891
Jackson	20	11	0	0	9	83,778
Kent	23	22	0	0	1	45,208
Macomb	2	0	0	0	2	5,515
Mason	23	13	0	0	10	38,039
Midland	6	2	0	0	4	18,164
Missaukee	10	9	0	0	1	40,275
Montcalm	21	13	0	0	8	65,751
Muskegon	1	0	0	0	1	1,132
Monroe	2	1	0	0	1	4,620
Newaygo	13	2	0	6	5	18,734
Oceana	8	6	0	0	2	20,069
Ogemaw	2	1	0	0	1	8,614
Ottawa	31	28	0	0	3	62,699
Roscommon	2	0	0	2	0	9,716
Saginaw	3	2	0	0	1	8,436
St. Clair	29	16	0	0	13	78,245
Tuscola	4	4	0	0	0	10,887
Washtenaw	6	0	0	2	4	15,811
Wayne	4	0	0	0	4	8,751
Total	476	233	0	46	*197	1,417,519

*Includes 53 service wells.

MICHIGAN
Wildcat Completions by Counties

County—	Total	Crude	Cond.	Gas	Dry	Footage
Allegan	10	1	0	0	9	25,624
Arenac	6	0	0	0	6	19,120
Bay	2	0	0	0	2	6,497
Branch	6	0	0	0	6	21,572
Calhoun	14	1	0	1	12	71,810
Clare	1	0	0	0	1	5,232
Eaton	1	0	0	0	1	5,016
Gladwin	1	0	0	0	1	4,986
Gratiot	2	0	0	0	2	6,453
Hillsdale	22	1	0	0	21	81,952
Huron	1	0	0	0	1	5,100
Isabella	2	0	0	0	2	7,474
Jackson	20	2	0	1	17	78,780
Kalamazoo	2	0	0	0	2	2,794
Kent	1	0	0	0	1	3,979
Lake	3	0	0	0	3	9,174
Lenawee	2	0	0	0	2	6,833
Montcalm	6	0	0	1	5	18,696
Mainstee	2	0	0	1	1	5,633
Mason	8	0	0	3	5	10,884
Mecosta	3	0	0	0	3	9,325
Missaukee	2	1	0	0	1	7,854
Montcalm	4	0	0	0	4	13,177
Monroe	2	0	0	0	2	4,954
Newaygo	9	0	0	0	9	15,588
Oakland	3	0	0	0	3	8,941
Oceana	11	0	0	0	11	24,144
Osceola	6	1	0	0	5	21,140
Ottawa	6	0	0	1	5	19,632
Saginaw	2	0	0	0	2	6,583
St. Clair	12	1	0	0	11	35,157
Tuscola	2	0	0	0	2	4,447
Van Buren	4	0	0	0	4	9,982
Wexford	2	0	0	0	2	8,116
Total	180	8	0	8	164	586,649

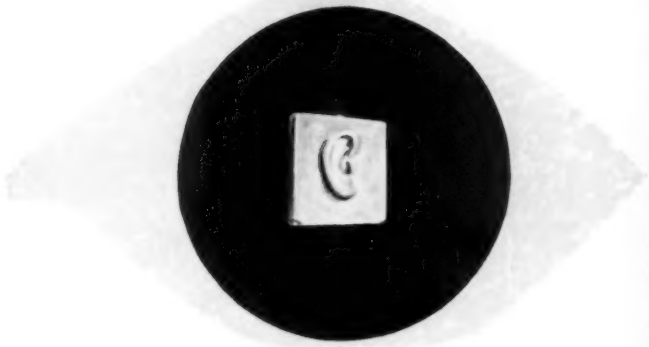
Coming February 8:

Special Pipeline Contractors Report

THE JOURNAL'S February 8 issue will bring you complete news and photo coverage of the Pipe Line Contractors Association meeting in Los Angeles—the most important business meeting of the year for pipeline contractors.

Watch for this special report in The Oil and Gas Journal 2 weeks from now.

HOW TO FIND OIL ... by Schlumberger

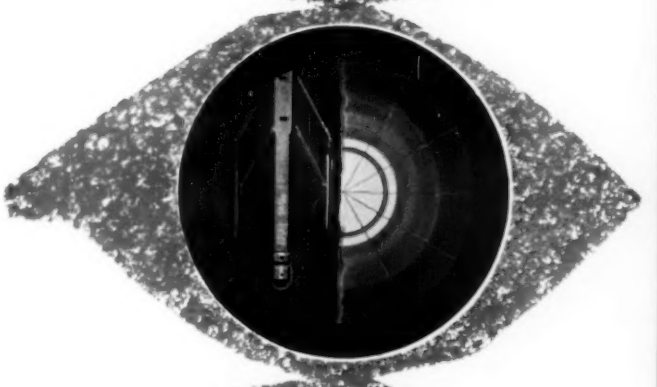


THE INDUCTION-ELECTRICAL LOG—*For Oil Saturation*
THE SONIC LOG—*For Reservoir Porosity*
SIDEWALL CORES—*For Visual Evidence*
THE MICROLOG—*For Net Pay Thickness*
THE FORMATION TESTER—*For Final Proof*

These are the services most often used for positive identification of oil in the reservoir. These are the services developed by Schlumberger to make oil finding a logical, orderly, efficient procedure.

When your investment in a well has mounted from geophysical exploration through drilling to contract depth, sound business calls for the most complete evaluation of all production possibilities. Insure against leaving any oil zone untapped by following this Schlumberger program for oil discovery. Only Schlumberger can give you the combined benefits of the industry's most accurate and dependable tools, and the most experienced field organization in both operation and interpretation.

Ask your Schlumberger engineer to help in planning the logging program on your next well.



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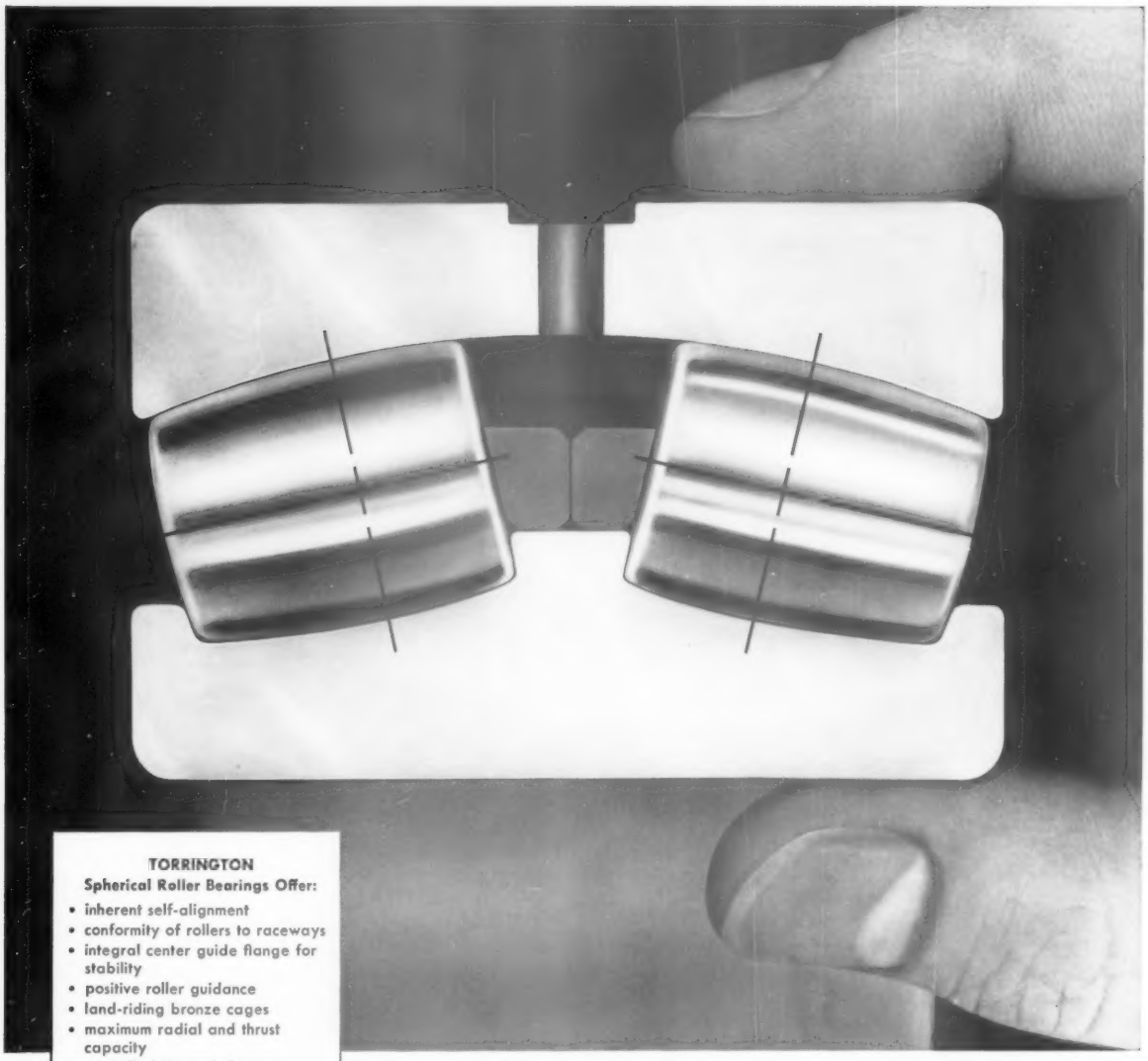

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BY W. L. NELSON
Technical Editor and Petroleum Consultant

Wages, construction costs continue to rise

REFINERY and other construction costs have advanced to a very high level. Costs are now double those of 1947, triple 1939, and four times the costs of 1933. Wages continue to dominate refinery construction costs, not only the wages of construction workmen, but also through the prices of steel and construction materials. Increases in steel prices are evident in June-August 1953, 1955, 1956, and 1957. A similar rise in materials costs can be expected during late 1959 and during the first half of 1960.

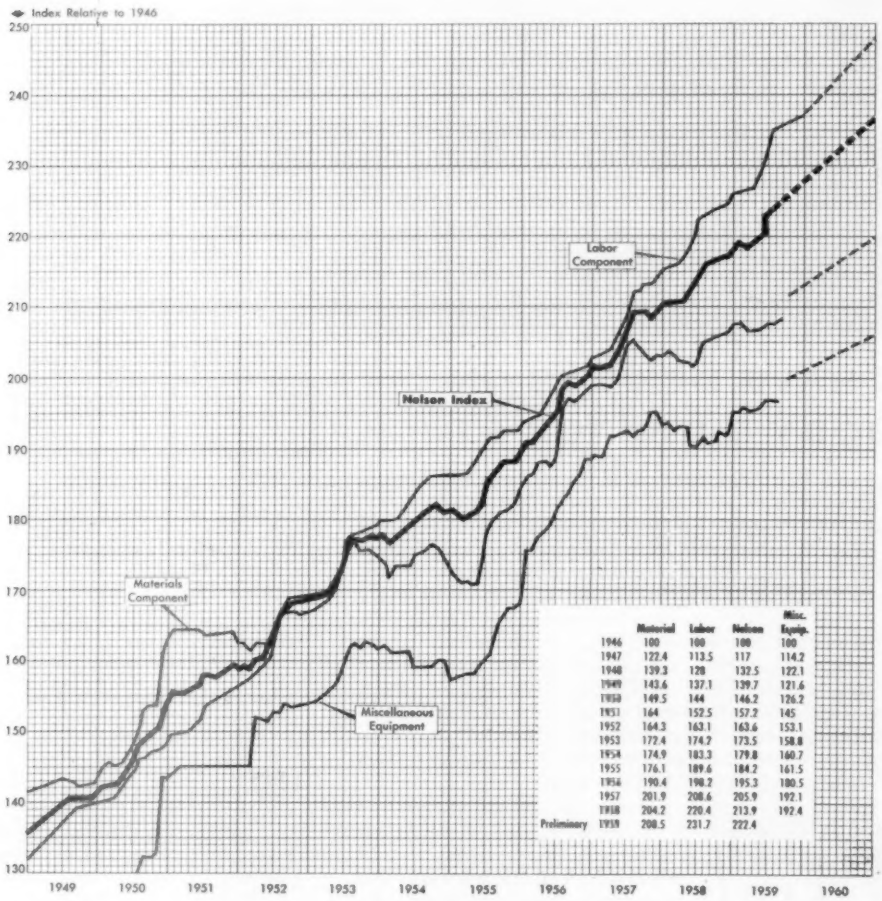
The Nelson Refinery Construction Cost Index is published in the first issue each month of The Oil and Gas Journal. It was described in the October 1, 1956, issue, page 110, and monthly values of the index have been tabulated in the issues of November 18, 1957, page 245 (1949-1956), and January 26, 1959, page 153 (1957 and 1958). Monthly values for the year 1959 are shown on this page.

Monthly Values of Index for 1959

	Materials component	Labor component	Miscellaneous equipment* average	Nelson index
January 1959	207.5	226.2	195.5	218.7
February	207.9	226.6	195.7	219.1
March	207.6	226.6	195.8	219.0
April	206.7	226.6	195.8	218.7
May	206.7	228.7	195.9	219.9
June	207.2	230.2	196.3	221.0
July	207.8	233.9	196.9	223.5
August	207.8	235.2	196.8	224.2
September	208.1	235.8	196.8	224.7
October	208.9	236.2	†197.8	225.3
November	209.7	236.6	‡199.1	225.8
December	†211.9	†237.0	‡202.0	†227.0
1959 year	†208.2	‡231.4	†197.1	†222.1

*Used only in computing the materials component. †Preliminary.

In addition to the construction-cost index, the Nelson Refinery Operating Cost Indexes are also published in the first issue each month. Also the indexes of several wage rates and many items of materials are published each quarter in the first issues of the months of January, April, July, and October, under the title "Itemized Cost Indexes." The latest issue (January 4, 1960) shows that 35 items remained unchanged, 25 items advanced, and 10 items declined during the May-August quarter. However, many increases in costs are now (January 1960) occurring.



	Material	Labor	Nelson	Misc. Equip.
1946	100	100	100	100
1947	122.4	113.5	117	114.2
1948	139.3	128	132.5	122.1
1949	143.6	137.1	139.7	121.6
1950	149.5	144	146.2	126.2
1951	164	152.5	157.2	145
1952	164.3	163.1	163.6	153.1
1953	172.4	174.2	173.5	158.8
1954	174.9	183.3	179.8	160.7
1955	176.1	189.6	184.2	161.5
1956	190.4	198.2	195.3	180.5
1957	201.9	208.6	205.9	192.1
1958	204.2	220.4	213.9	192.4
Preliminary 1959	208.5	231.7	222.4	

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The HOUDRIFLOW Process accepts in liquid or vapor form any fraction between naphtha and asphalt from both sweet and sour crudes. In the HOUDRESID Process, reduced crudes are converted into high octane gasoline and light distillate fuel—without production of heavy residual fuel.

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BOOKS

THE AMERICAN PETROLEUM INDUSTRY; THE AGE OF ILLUMINATION, by Harold F. Williamson and Arnold R. Daum. Northwestern University Press. $7.50. 864 pages.

This is the big historical project of the American Petroleum Institute, conducted through a grant to Northwestern University. It is a definite, authoritative history of the oil industry from its earliest beginnings through 1899, and will be followed by a second volume covering developments since 1900.

It is written by a pair of Ph.D.'s who are specialists in economic history and who spent some 4 years in research for this volume. It tells the story of oil in narrative form designed to interest both oil men and laymen, and maintains a fine balance of the technical, economic, and political influences and results of the oil industry's growth.

The book is well illustrated with photographs, maps, and charts, and an extensive appendix includes pertinent statistics and other reference material. All sources are thoroughly documented and footnoted. This professionally done, official history of the oil business will be the standard reference work for many years.

ORGANIC SYNTHESES, Vol. 39. Edited by Max Tishler. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16. 114 pp. $4.

This is an annual publication of satisfactory methods for the preparation of organic chemicals. Some 39 authors contributed articles for this volume, on subjects ranging from benzeneboronic anhydride to trithiocarbodiglycolic acid.

The procedures represent optimum conditions, and the procedures have been checked carefully for yield and physical properties of the products as well as for any hazards that may be involved.

Full details of all manipulations are described, and the range of yields are reported rather than the maximum yield obtainable by an operator who has had considerable experience with the preparation.

OIL & PETROLEUM YEAR BOOK. Compiled by Walter E. Skinner. Published by Walter E. Skinner, 20 Copthall Avenue, London E.C. 2, England. $7. 795 pp.

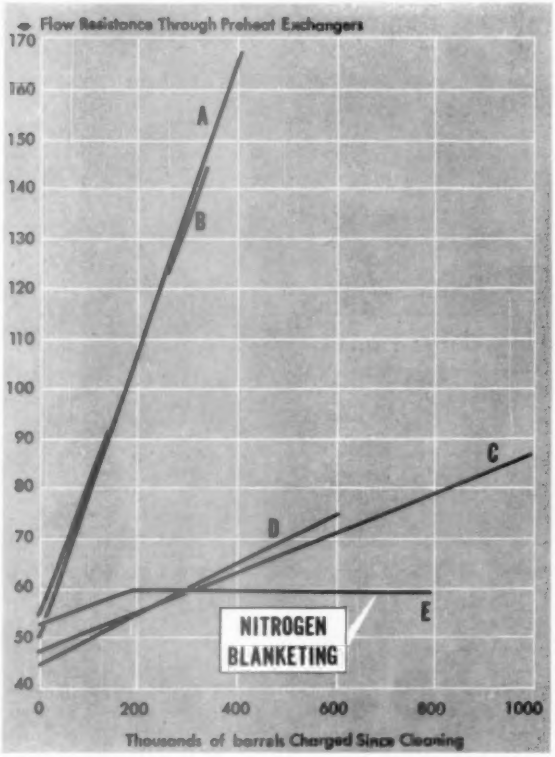
This is the 50th edition of a book which for many is the standard reference work of oil companies throughout the world.

The new edition contains these features: A section devoted to complete and up-to-date particulars of 1,100 of the principal British, American, Canadian, and foreign oil companies, covering all branches of the industry, and an international buyers' guide, containing over 2,000 headings and entries of international manufacturers and suppliers of plant, equipment, accessories, geophysical and prospecting companies.

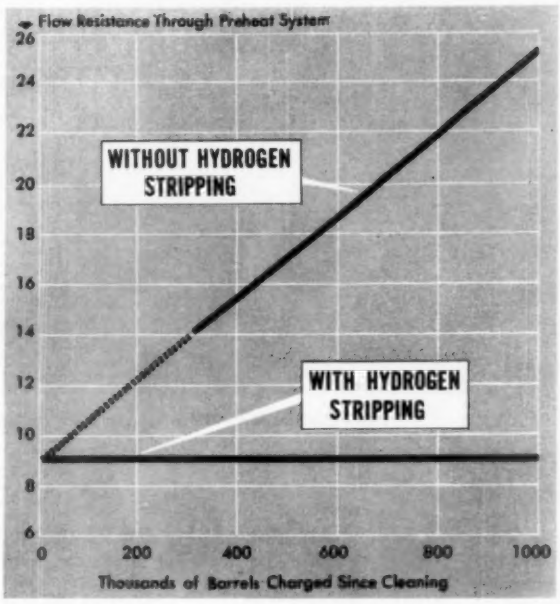
Also included is a section giving 740 names and addresses of managers, engineers, and agents, as well as the companies with which they are associated. A comprehensive world crude-oil and natural-gasoline table shows annual world production in countries from 1949 to 1958.

There are color maps of the Middle East oil fields, refineries, pumping stations, and pipelines and the trans-Canada natural-gas transmission system.

Note: The Oil and Gas Journal maintains a book department. Write to the READER SERVICE DEPARTMENT, P. O. Box 1260, Tulsa 1, for copies of the book list. Often books reviewed here may be purchased from this source.



REFORMER A: Curves A and B show effects with unsaturates present in feed; D and C with unsaturates removed; E shows effect of unsaturate removal plus nitrogen blanketing of storage tanks. Fig. 1.



REFORMER B: Feed for this unit comes from both floating-roof and unblanketed cone-roof tanks. Onstream time is improved significantly when oxygen is stripped from feed stream with hydrogen. Fig. 2.

How Atlantic attacked fouling of preheat exchangers in cat reforming units

Studies on two reformers show that nitrogen blanketing of storage tanks, hydrogen stripping, and the removal of unsaturates from feed will give longer, better operation

WELL-MAINTAINED floating-roof tanks and elimination of undesirable feed stocks curtail fouling of preheat exchangers in catalytic-reforming units.

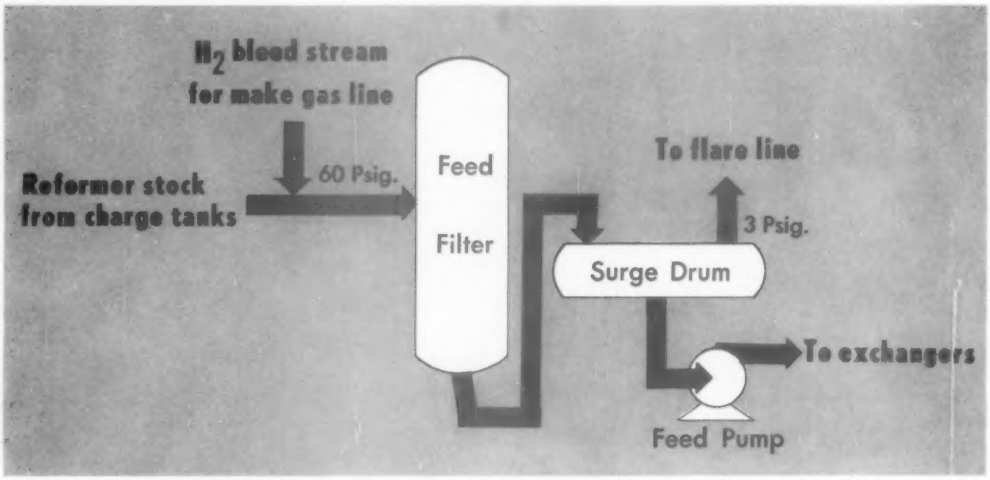
Hydrogen stripping of feed reduces oxygen content of stocks, hence reduces exchanger fouling.

These conclusions came out of studies conducted by Atlantic Refining Co. on two catalytic reforming units. Both units were subject to sharp buildups in pressure drop through the preheat exchangers. Modifications in operation, equipment, and techniques ended fouling due to oxidation of naphtha feed stocks.

Olefin removal . . . On one of the reformers, Unit A, feed consisted of a mixture of low and high-sulfur stocks. This naphtha charge came mainly from a primary distillation unit which fed directly into two floating-roof tanks. These have a large vapor area between the central and outer pontoons.

First step to curtail fouling was complete removal of olefinic visbreaker naphtha from the reformer feed. This unstable material, being susceptible to oxidation, helped form undesirable compounds which cause fouling. Improved operation of the preheat exchangers resulted from this change.

"Partial removal of oxygen resulted in significant improvements."



HYDROGEN-STRIPPING system cuts oxygen content of feed to Reformer B. Fig. 3.

Prior to the move, flow resistance, measured in abstract units for this discussion, tripled after the unit had processed about 350,000 bbl. of charge, following cleaning of the preheat exchangers. Flow resistance ran around 50 when the unit was put onstream, doubled when throughput reached 170,000 bbl., and tripled when the 350,000-bbl. figure had been reached. This was naturally reflected in unit operations and early down times.

Once the olefinic material had been removed, the unit could charge over a million barrels before flow resistance doubled. In the initial run under these conditions, flow resistance was 47 when the unit was placed onstream and had increased to only 88 by the time a million barrels had been charged.

The before-and-after situation is presented in Fig. 1. Curve B was made on the run immediately preceding unsaturate removal from the charge stock. Curve C was the first run under the new conditions.

Although conditions had been improved, Atlantic wanted more. Oxygen was detected in the vapor space of the floating-roof tanks and it was felt that this was contributing to fouling, although at a reduced rate.

To correct this, nitrogen was bled in small quantities into the vapor space to minimize the possibility of oxygen contact. This program was begun after about 200,000 bbl. of material had been charged during run E. The fouling curve began at a flow resistance unit of 53 and immediately paralleled the slope in curves C and D, increasing to 60 when throughput reached about 185,000 bbl. From this point on, however, the fouling curve remained constant at the 60 level, with throughput totaling 800,000 bbl.

The flat fouling curve on the remainder of run E confirmed the importance of keeping reformer feed from contact with air. The floating-roof tanks were checked for air leakage. Minor repairs were effective in making the tanks airtight. Hence, it has since been possible to eliminate the nitrogen purge while charging virgin feed stocks.

H_2 stripping . . . The situation with reformer B presented a different problem, since oxygen was picked up by the feed stocks. Feed for this unit was drawn from both floating-roof and unblanketed cone-roof tanks. A sharp buildup in pressure drop was experienced in the preheat exchangers in this unit. Starting at a flow-resistance unit figure of nine, the resistance doubled by the time 550,000 bbl. had been charged (Fig. 2). This resistance increased to 25.2 by the time 1 million barrels had passed through the exchangers.

TABLE 1—HYDROGEN STRIPPING OF REFORMER FEED

Cu. ft. of H_2 per bbl. of feed	Inlet O_2 p.p.m.	Outlet O_2 p.p.m.	% Removal
3.25	65	34	48
3.25	61	30	51
5.20	87	34	61
5.20	89	26	71

A simple hydrogen-stripping system was installed to remove oxygen from the feed. Hydrogen was bled into the feed upstream from a filter designed to remove entrained solids from the naphtha (Fig. 3). The stream, operating at 60 psig., is allowed to flash into a low-pressure surge drum (3 psig.). A feed pump picks up naphtha here and charges it to the preheat exchangers.

Oxygen content of the inlet stream varies according to hydrogen-stripping rate. Some typical concentrations and results are given in Table 1. Inlet oxygen ranges from 65 to 89 p.p.m. Outlet oxygen ranges from 34 to 26 p.p.m. The two hydrogen-stripping rates used in this comparison were 3.25 and 5.2 cu. ft. per bbl. The higher rates were more effective in their stripping action with an average of 66% of the oxygen removed. The lower rates resulted in an average 49.5% removal of oxygen.

The partial removal of oxygen, however, resulted in significant improvements. A completely flat curve resulted once hydrogen stripping was used, with no increase in flow resistance through the exchangers even with a million barrels of naphtha passing through the unit.

Acknowledgments . . . Cooperation of the management of Atlantic Refining Co. in the release of this information and the assistance of M. J. Fowle and Herb Zachow in the compilation of data are gratefully acknowledged.

STATEMENT OF CONDITION

December 31, 1959

RESOURCES		
Cash and Due from Banks	$84,871,820.03	
U. S. Government Securities	73,225,238.21	
Other Bonds and Warrants	12,921,895.18	$171,018,953.42
Loans and Discounts		113,576,127.03
Income Receivable Accrued		672,137.05
Stock in Federal Reserve Bank		397,500.00
Bank Premises		4,000,000.00
Customer's Liability Under Letters of Credit		278,031.00
		$289,942,748.50

LIABILITIES		
Deposits		$267,057,655.24
Letters of Credit Outstanding		278,031.00
Income Collected, Not Earned		499,136.94
Reserve for Taxes, Interest, etc.		1,412,464.06
Capital—Common	5,500,000.00	
Surplus	7,750,000.00	
Undivided Profits and Reserves	7,445,461.26	20,695,461.26
		$289,942,748.50

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**Single in Kind or Excellence*

Customers can be credited for Union's outstanding position.

Why? Simply because in large numbers they accepted Union's standing invitation to share their wire rope and sling problems with Union's technical, research and engineering staff.

In meeting these challenges, Union has compiled an outstanding record in wire rope advancements. Some 1600 standard wire rope constructions are in day-to-day production under statistical quality controls which insure "the ultimate low cost rope." This means quality so good that it costs less in the long run.

In searching for better answers to wire rope and sling problems for customers, Union engineers developed the famous family of Tuffy wire ropes and slings.

Rotary drilling called for a special wire rope. There was none until after Union engineers spent many months in the field studying the operation of standard constructions on rotary rigs. Back in the Union laboratories, they researched many constructions to find the special one that performed better, gave longer service life, less down-time and greater safety in rotary drilling. Tuffy Rotary Line proved its excellence and in the proving Union Wire Rope engineers developed the rope saving cut-off procedure now widely followed in rotary drilling.

Tuffy® Rotary Drilling Line

Tuffy Rotary Drilling Lines Are "Ton-Mile Engineered"

Tuffy Standard Rotary Line is "ton-mile" engineered for standard rigs and large jackknife rotary rigs. Tuffy Jackknife Rotary Line is for drilling to 6,000 feet with smaller jackknife rigs.

Union Wire Rope Covers All the Bases In the Oil Industry

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Big Paul, The King of Spades, world's largest electric power shovel. In taking a 105 ton bite (2 rail carloads) it imposes a maximum bail pull upon the wire ropes of 550,000 lbs. One-half mile of wire rope is required in its operation by the Peabody Coal Company at its modern River King Mine, Freeburg, Ill.

Wherever you are in the oil world, Union standard wire ropes and Tuffy Rotary lines are quickly available from leading oil field supply stores. Get service you can rely on. Get the Ultimate low cost wire rope.

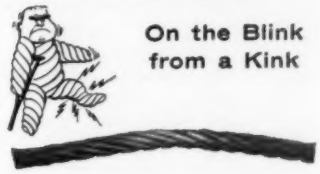
Ton Mile Indicator

This slide chart provides you a quick, easy method of figuring ton-miles in following the cut-off practice originally developed by Union engineers. Write Union Wire Rope Corporation, 2102 Manchester Ave., Kansas City 26, Mo.

1-0

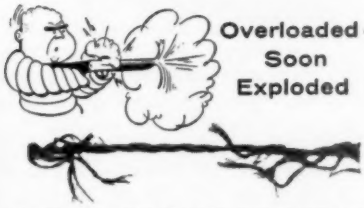
Tuffy Wire Rope Tips

on Safe Use of Wire Rope and Slings



On the Blink from a Kink

Mishandling of rope caused this open kink. Avoid kinks by proper winding on the drum. Never pull a loop smaller. Enlarge it, then straighten out the rope.



Overloaded - Soon Exploded

The rated capacity of a wire rope is based on breaking strength divided by the load factor for particular type of service. Grade of steel, type of construction and size of rope determine tensile strength. Unless rope is properly related to loads, costly and dangerous early failures are likely to occur.

Mangled in a Wedge Socket

Here's a result of improper socketing, caused by poorly designed or worn-out wedge socket. Can be costly and hazardous!

Victim of the "Bends"

Excessive bending of rope speeds up wear. General rule: use more flexible ropes as bending stresses increase (with decrease in tread diameter of sheave or drum). If sheaves are too small, early rope failure is certain.

Would you like a copy of a booklet in which more than a score of Tuffy Tips like those above are reproduced. If so, write Union Wire Rope Corporation, 2102 Manchester Ave., Kansas City 26, Missouri.

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OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company
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How pressure affects gases

IT SHOULD always be remembered that atmospheric pressure of 14.7 psi. is being constantly applied to all equipment. As soon as the internal pressure in a vessel is allowed to fall below atmospheric pressure, we begin to subject the vessel to enormous forces. For example, on a 10 by 30-ft. drum if the pressure is 10 psi. less than atmospheric, the force that the atmosphere would create on only one end of the drum would be about 110,000 lb.

A vacuum can be measured with a mercury column. Earlier in this series we mentioned mercury would build up to 5.90-psi. pressure per foot of height. If a vacuum is applied to the top end of a long glass tube and the bottom end put in a jar of mercury, the mercury will rise 1 ft. for every 5.90 psi. less than atmospheric pressure. The reason that the mercury column rises is that as air is removed from the top of the tube a lower pressure than atmospheric pressure is created above the column of mercury and the atmospheric pressure outside the tube pushes the mercury up.

Since it is the atmospheric pressure that is pushing the mercury up, the mercury will rise only about 2½ ft. (2½ ft. x 5.90 psi. per ft. = 14.7 psi.). Since water is lighter than mercury, normal atmospheric pressure will push water up 34 ft. high in a column. This is why the best pump in the world cannot have a water suction lift higher than 34 ft. This is also why suction conditions on a pump are very important if the pump is to operate properly.

Almost all of the refinery process gages read vacuum in inches of mercury less than atmospheric pressure. Since 30 in. (2½ ft.) of mercury is equivalent to 14.7 psi., every inch of mercury is equivalent to 0.49 psi. For example, 10 in. of mercury vacuum is the same as 4.9 psi. less than atmospheric pressure, or 9.8 psia. (14.7 − 4.9 = 9.8).

Gas Under Pressure

Gas has great compressibility. When compressed and released, it immediately returns to its former state. If not enclosed in a container, the gas will mix with outside gases and is soon lost. This property makes air, a mixture of common gases, a useful material for filling footballs, air cushions, automobile tires, etc., and as a medium for transferring energy.

An Irishman named Robert Boyle set forth the principle that at a constant temperature the volume of a gas varies with the pressure. That is, to reduce a volume of gas to one-half of its normal volume the absolute pressure of the gas will have to be doubled. On the other hand, if the pressure is halved the volume would double. Thus, if a quantity of gas with a pressure of, say, 20 psia. must be reduced to 1/10 the space, the absolute pressure will have to be increased 10 times as much as 20 psia., or 200 psia.

This principle has many valuable uses in the refinery. It is necessary to know the strength of boilers, gas containers, pipelines, etc., in order to know how much a gas may be compressed with safety.

The volume a pound of gas will occupy is also affected by the temperature. Since this volume does change so much with pressure and temperature a standard set of conditions is used to measure gas volumes. These conditions are normal atmospheric pressure (14.7 psi.) and 60° F. temperature. Where you see S.c.f.m. it means standard cubic feet per minute. For example, a cubic foot of gas under three times atmospheric pressure (44.1 psia. or 29.4 psig.) would occupy 3 cu. ft. under standard conditions and is said to be 3 s.c.f.

(1 cu. ft. × 44.1 psia./14.7 psia. = 3 cu. ft.)

Like gases, liquids increase in volume when they are heated. However, since liquids are not compressible, pressures will increase enormously if a constant volume of liquid is heated. It is most important to remember this fact in handling liquids in the refinery. If a line is to be shut off, one end should be left open or a bleeder opened so that the volume expansion resulting from the sun's radiant heat or any other heat source can be released.

Similarly, on heat exchangers, the cold-fluid side should always be given an outlet to avoid overpressuring as a result of the heat pickup from the hot-fluid side. For the same reason, sample containers should always have about 10% gas space left above the liquid to allow for thermal expansion to avoid rupturing the container.

Pressure Affects Boiling Point

One of the main uses for pressure in the refinery is to change the boiling point of liquids. For example, water boils at 212° F. under normal atmospheric pressure. At 100 psig. water boils at 338° F. At 10 psi. less than atmospheric pressure water boils at 159° F. The same reduction in boiling point applies to liquid hydrocarbons. For example, at a vacuum pipe still the pressure is reduced to less than 1 psia. with the result that heavy oils are boiled off (distillated) at feed inlet temperature of about 700° F. Without the vacuum the feed would have to be heated to over 1,100° F. to boil off the heavy oils. At this high temperature detrimental cracking would also result.

Summary—Pressure

Here are some important points about pressure:

Pressure is force or weight per unit area.

All fluids (liquids and gases) have weight.

All fluids build up static pressure.

The amount of static pressure depends on the height of fluid and the density—not the shape of the vessel.

Fluid pressure is transmitted in all directions equally.

The weight of air causes an atmospheric pressure of 14.7 psia.

Less than 14.7 psia. is a vacuum.

A small pressure over an area like a tank or vessel can create large forces.

Atmospheric pressure can collapse many vessels that have a vacuum inside.

Condensing gases in vessels or draining of liquids from vessels or tanks not properly vented will create a vacuum.

Gases are compressible—liquids are not.

If the pressure on a gas is doubled, the volume will halve.

If the pressure is halved, the volume will double.

Pressure affects boiling point.

This material taken from process-training-program manual, Bayway, N. J., refinery of Esso Standard Oil Co.

1959 TOWER TESTS

Show Marley's Plus Performance Value

Here is the RECORD OF PERFORMANCE . . . consecutive results of all acceptance tests of Marley industrial Cross-Flow cooling towers made in 1959. This tabulation certifies Marley's ability to rate towers correctly and its single-minded purpose of applying them exactly as rated. Here are factual reports from 27 Marley installations in all parts of the country. Their specified capacities, operating conditions and types of service are as diversified as their geography, but tests uniformly emphasize the fact that these customers received a performance bonus that points up Marley Cross-Flows as vital investments in plant capacity and operating efficiency.

TEST NO.	TYPE OF SERVICE AND LOCATION	SPECIFIED CONDITIONS				TEST RESULT[4]	
		Gallons Per Minute	Hot Water Temp.	Cold Water Temp.	Wet Bulb Temp.	Degrees Cold Water Temp.[5]	Percent Capacity
1[1]	Generating Station—Mid-Atlantic	220,000	97°	78°	70°	+0.35°	+ 3.5%
2	Petroleum Refinery—Gulf Coast	3,500	95°	83°	70°	+ .47°	+ 4.0%
3	Generating Station—Southern	20,000	100°	85°	78°	+ .19°	+ 1.9%
4	Generating Station—Rocky Mtns.	89,300	95°	82°	60°	+1.88°	+ 9.75%
5[2]	Generating Station—S. Atlantic	75,000	113°	90°	74°	+ .20°	+ 1.25%
6	Petroleum Refinery—Gulf Coast	8,600	105.8°	87°	82°	+ .45°	+ 5.8%
7	Appliance Mfg. Plant—E. Central	7,750	95°	85°	78°	+ .40°	+ 5.00%
8[2]	Petroleum Refinery—Gulf Coast	45,000	112°	89°	82.5°	+ .72°	+ 6.65%
9	Generating Station—Mid-Central	62,400	107.5°	90°	76°	+1.10°	+ 7.3%
10	Petroleum Refinery—N. Atlantic	12,900	115°	85°	78°	±0.00°	± 0.0%
11[2]	Meat Packing Plant—North Central	6,000	105°	85°	75°	+ .60°	+ 5.2%
12	Jet Engine Plant—South Atlantic	20,000	95°	85°	79°	+ .40°	+ 6.0%
13	Generating Station—Gulf Coast	65,000	104.6°	87°	76.5°	+ .45°	+ 3.3%
14[2]	Petroleum Refinery—Gulf Coast	17,500	111°	90°	80°	+ .47°	+ 3.5%
15[2]	Petroleum Refinery—North Central	4,150	110°	75°	68°	− .10°	− 0.6%
16	Petroleum Refinery—East Central	19,400	120°	85°	75°	+ .65°	+ 5.5%
17[2]	Petroleum Refinery—Gulf Coast	57,500	120°	85°	79°	− .17°	− 1.3%
18	Petrochemical Plant—Gulf Coast	15,000	115°	90°	78°	+ .70°	+ 5.3%
19[2]	Air Conditioning—Mid-Atlantic	3,600	95°	85°	78°	+ .70°	+12.6%
20[2]	Atomic Test Facility—North West	70,000	112°	87°	65°	+1.50°	+ 5.9%
21	Chemical Plant—Gulf Coast	1,350	155°	86°	81°	+ .10°	+ 1.4%
22	Air Conditioning—Gulf Coast	7,000	93.5°	86°	80°	+ .30°	+ 6.0%
23[3]	Petroleum Refinery—Central	60,000	120°	80.6°	70°	+ .25°	+ 1.84%
24	Paper Mill—South Central	10,000	116°	86°	79°	+ .05°	+ 0.25%
25	Air Conditioning—South Central	6,000	105°	85°	78°	+ .25°	+ 2.7%
26	Generating Station—Mid-South	38,000	103.2°	90°	80°	+ .70°	+ 5.4%
27	Generating Station—West Coast	34,000	96°	80°	70°	+ .42°	+ 3.75%

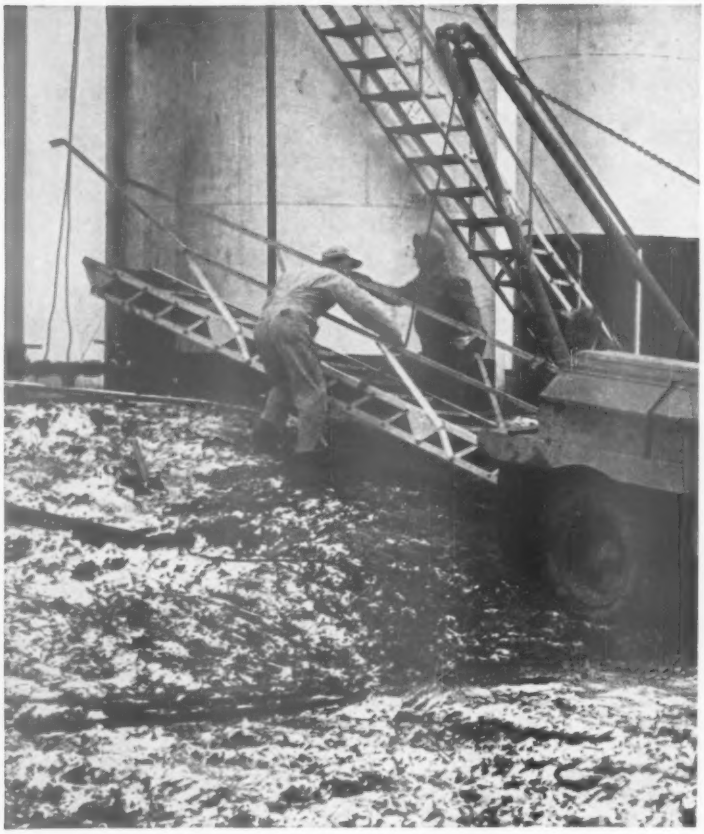
NOTES: 1) Total capacity four identical towers: results are average of tests conducted on two towers. 2) Cooling Tower Institute observer present during tests. 3) Test of tower remodeled to increase performance after more than 13 years of service. 4) Test results are adjusted to specified conditions. 5) + indicates lower cold water temperature than specified; — indicates higher cold water temperature than specified.

"TEST YOUR TOWER"—a brochure that details the Marley method of tower testing, and "ANALYZE YOUR BIDS"—one that presents a logical means of pre-purchase evaluation, should be in every engineering library. Your Marley engineer will gladly furnish copies or just send a request to

THE MARLEY COMPANY MARLEY **KANSAS CITY, MISSOURI**

HERE'S ANOTHER REASON WHY
FORD TRUCKS ARE YOUR BEST BUY!

"REGARDLESS OF THE TERRAIN— MUD FIELDS... SAND... SWAMP BEDS—WE DEPEND ON OUR FORDS TO DO THE TOUGHEST JOBS"



SAYS ARNOLD J. LEWIS, MAINTENANCE FOREMAN, FARM BUREAU OIL COMPANY, INC., MT. VERNON, INDIANA

"Our trucks can be found anywhere within a 250-mile radius of Mt. Vernon transporting men and equipment needed for every phase of the oil business. We usually put our 28 Ford Trucks on the toughest jobs because we can depend on them to keep going even if they have to winch themselves out.

"The performance of our Fords is truly outstanding, when you consider that many of our jobs take us along river banks and through plowed fields with mud axle-deep.

"The engines are used just as much for winching and driving other equipment during field operations as they are for highway driving. In two years we get up to 140,000 engine miles on our Fords before we trade them in. During that time we change the oil and oil filter every 2,000 miles and seldom add any oil between changes.

FORD F-600 shown above has a special utility bed designed and built in the Farm Bureau Oil Co. shop. It features a power driven pipe-threading attachment, heavy-duty winch, gin poles, headache rack, rolling tailboard, two-way radio plus both arc and gas welding equipment.

FORD TRUCKS

"In this connection I might add that engine and accessory maintenance is much easier on the newer Fords since they have enlarged the engine compartment.

"Excellent parts availability is another reason why we use Ford Trucks on our toughest jobs ... and we can always get Ford parts at a reasonable price.

"We haven't bought any '60s yet, but it appears that Ford has many new and improved vehicles to choose from and I am sure that we will be purchasing them as we have in the past."

Big Fords for '60 are built for longer life . . . with Certified Durability!

Whatever your job . . . wherever you do it . . . you'll discover just as Mr. Lewis did, that Ford Trucks are the best investment you can make for your transportation dollar.

Certified results of tests conducted by America's leading independent research organization* confirm the fact that Ford Super Duties have been refined for added durability! For example . . .

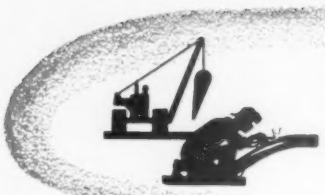
Automatic radiator shutters reduced the coolant temperature variation recorded in severe mountain road tests from a 79° range to a 20° range. Engine operation with coolant temperatures in the 167° to 187° range means less expansion and contraction, more efficient combustion and better lubrication . . . all of which contribute to longer engine life.

Dynamometer tests showed *no vapor lock* with Ford's submerged-type electric fuel pump at temperatures up to 200°. Incipient vapor lock with mechanical fuel pump resulted in a power loss of 9% under the same conditions. Shaker table tests plus constant exposure to oil, water and heat proved 1960 wiring harness to be *three times longer lived.*

Test results plus the experience of satisfied users are important, but that is not all. For 1960, the Super Duty line has been broadened to provide even more flexibility in power train options. See your Ford Dealer!

**Name available on request*

COST LESS *LESS TO OWN . . . LESS TO RUN . . . BUILT TO LAST LONGER, TOO!*



Monthly Report on PIPELINE CONSTRUCTION

PIPELINE ACTIVITY reported here is compiled from surveys by The Oil and Gas Journal among pipeline companies and construction contractors.

This summary report appears in the last issue of the Journal each month. New construction projects are reported weekly in Pipeline Briefs in the Journal's news section.

Projects are listed in three groups —U. S., Canadian, and Foreign— and according to type of line—crude, products, or natural gas.

U. S. Crude Oil Pipelines

- **Cape Pipe Line Co.** (Sun Oil Co., Cities Service Co., Atlantic Refining Co.), Philadelphia.

Project: Line from lower Delaware Bay to Philadelphia.

Status: Planned.

- **Cooperative Refinery Association,** Kansas City, Mo.

Project: 6 miles of 6-in. at Stockton, Kans.

Status: Planned.

Completion: Spring 1960.

- **Gillette Pipeline, Inc.,** and **A. W. Hartwig, Inc.**

Project: A 102-mile line from Dead Horse Creek field to Casper, Wyo.

Status: Pending Wyoming Public Service Commission approval.

- **International Oil Pipeline Corp.,** New York City.

Project: Would own U. S. section of 1,500-mile, 30-in. line proposed by Mid-Continent Pipe Lines, Ltd., from Edmonton, Alta., to Chicago. (See Canadian Crude-Oil Pipelines).

Status: Proposed.

- **Standard Oil Co. of California,** San Francisco.

Project: 22 miles of 8-in. from Swanson River Unit on Kenai Peninsula to Nikiski on Cook Inlet, Alaska.

Status: Planned.

U. S. Products Pipelines

- **Humble Oil & Refining Co.,** Houston.

Project: About 34 miles of 4-in. line to move propylene from Baytown refinery to petrochemical plant at Texas City.

- **Humble Pipe Line Co.,** Houston, Tex.

Project: 27 miles of 10-in. from Baytown to Houston.

Status: Under way.

Contractor: **Golightly Construction Corp.,** Houston, Tex.

Completion: February 21, 1960.

- **Husky Oil Co.,** Cody, Wyo.

Project: About 100 miles from Cody to the Yellowstone products line west from Billings, Mont.

Status: Planned.

Completion: Late 1960.

- **Missouri-Kansas-Texas Railroad,** New York.

Project: 2,500-mile LPG system from West Texas-New Mexico area to upper Midwest. Main line would be 1,500 miles, with extensive gathering systems to connect gasoline plants in West Texas, southeastern New Mexico, and Texas Panhandle. The line from the Southwest would fork at McPherson, Kans., with one branch going to Minneapolis and the other to Madison, Wis. Size of pipe would be 10 and 12-in. with branches 6 to 8-in.

Status: Planned. Project will be started first half of 1960, possibly in February.

Completion: Fall 1960.

- **Texas Gas Transmission Corp.,** Owensboro, Ky.

Project: About 27 miles of 6-in. from Woodlawn to the Eunice dehydration plant in Louisiana.

Status: Under way.

Contractor: **Houston Contracting Co.**

Completion: February 1960.

U. S. Natural Gas Pipelines

- **Anchorage Gas Corp.,** Houston.

Project: 165 miles of line at least 12-in. in diameter from Kenai Peninsula to Anchorage.

Status: Planned. Construction may start late April or early May 1960.

- **Arkansas Industrial Pipeline Corp.** (Arkansas Louisiana Gas Co.), Shreveport, La.

Project: 130 miles of 18-in. from Perla to Helena, Ark.

Status: Planned.

Completion: 1960.

- **Arkansas Louisiana Gas Co.,** Shreveport, La.

Project: About 58 miles of 2, 3, 4, and 6-in. line in various locations.

Status: Planned.

Completion: 1960.

- **Carolina Pipeline Co.,** Columbia, S. C.

Project: 85 miles of 8-in. in South Carolina.

Status: Pending FPC approval.

- **Central Hudson Gas & Electric Corp.,** Poughkeepsie, N. Y.

Project: About 16 miles of 10-in. from Sleightsburgh to Highland, N. Y.

Status: Planned.

Completion: November 1960.

- **Coastal States Gas Producing Co.,** Corpus Christi, Tex.

Project: 60 miles of 10-in. in La Salle and Frio counties, Texas.

Status: Planned.

Completion: June 1960.

- **Coastal Transmission Corp.,** Houston.

Project: 65 miles of 3, 4, 6, and 10-in. in Texas and Louisiana.

Status:Pending before FPC.

Completion: Summer 1960.

- **Colorado Interstate Gas Co.,** Colorado Springs, Colo.

Project: 109 miles of 26-in. from Four-Way station in Texas Panhandle, to Morton Junction in southeastern Colorado; 135 miles of 34-in. from there to Pueblo, and 107 miles of 30-in. on to Denver; 148 miles of 34-in. from CIG line at Rock Springs, Wyo., to Provo, Utah, to connect with proposed El Paso Natural Gas Co.'s line to California.

Status: Pending FPC approval.

Completion: 1960.

Project: 32 miles of 6-in. from Central Colorado to Trinidad.

Status: Awaiting FPC approval.

Completion: 1960.

- **Colorado Oil & Gas Corp.,** Denver.

Project: 402-mile line from Gubik field to Fairbanks, Alaska.

Status: Proposed.

- **Columbia Gulf Transmission Co.,** Houston.

Project: 10 miles of 12-in. supply loop to Erath field, Vermilion Parish, Louisiana, and 9 miles of various-size field lines in Acadia and Vermilion parishes, Louisiana.

Status: Approved.

Project: 10 miles of 20-in. loop in Jefferson Davis and Vermilion parishes, Louisiana, and 3 miles of 6-in. loop in Cameron Parish, Louisiana.

Status: Approved.

- **Consumers Power Co.,** Jackson, Mich.

Project: 121 miles of 26-in. from the Indiana-Michigan border to Northville, Mich., and 22 miles of 24-in. from Northville to Clarkston, Mich.

Status: Under way.

Contractor: **Cape Construction Co., Inc.,** Cape Girardeau, Mo.

Completion: February 15, 1960.

- **El Paso Natural Gas Co.,** El Paso, Tex.

Project: 34.2 miles of 20-in. from Puckett, Tex., to Goldsmith plant; 51.3 miles of 20-in. from Terrell to Puckett Plant discharge; and 23 miles of 20-in. from Goldsmith to Eunice-Dumas line.

Status: Pending FPC approval.

Project: 244 miles of 30-in. Permian-San Juan Line loops.

Status: Under way.

Contractor: **R. H. Fulton & Co.,** Lubbock, Tex., has contract for 126 miles in New Mexico, with office in Tatum, N. M.

Project: 395 miles of 34-in. from Salt Lake City, to California border near Las Vegas, Nev.

Status: Pending FPC approval.

Completion: January 1, 1961.

- **Equitable Gas Co.,** Pittsburgh, Pa.

Project: 17 miles of 16-in. in Marion and Monangalia counties, West Virginia.

Status: Pending FPC approval.

Completion: October 31, 1960.

Project: 3½ miles of 20-in. in Greene County, Pennsylvania.

Status: Pending FPC approval.

Completion: October 31, 1960.

- **Gulf Resources, Inc.,** New York.

Project: 136 miles of 14 and 20-in. from Hidalgo County to LaSalle County, Texas.

Status: Pending FPC approval.

- **Hope Natural Gas Co.,** Clarksburg, W. Va.

Project: 20 miles of 24-in. line in Wetzel and Monongalia counties, West Virginia, replacing two 16-in. lines.

Status: Approved.

- **Houston Texas Gas & Oil Corp.,** St. Petersburg, Fla.

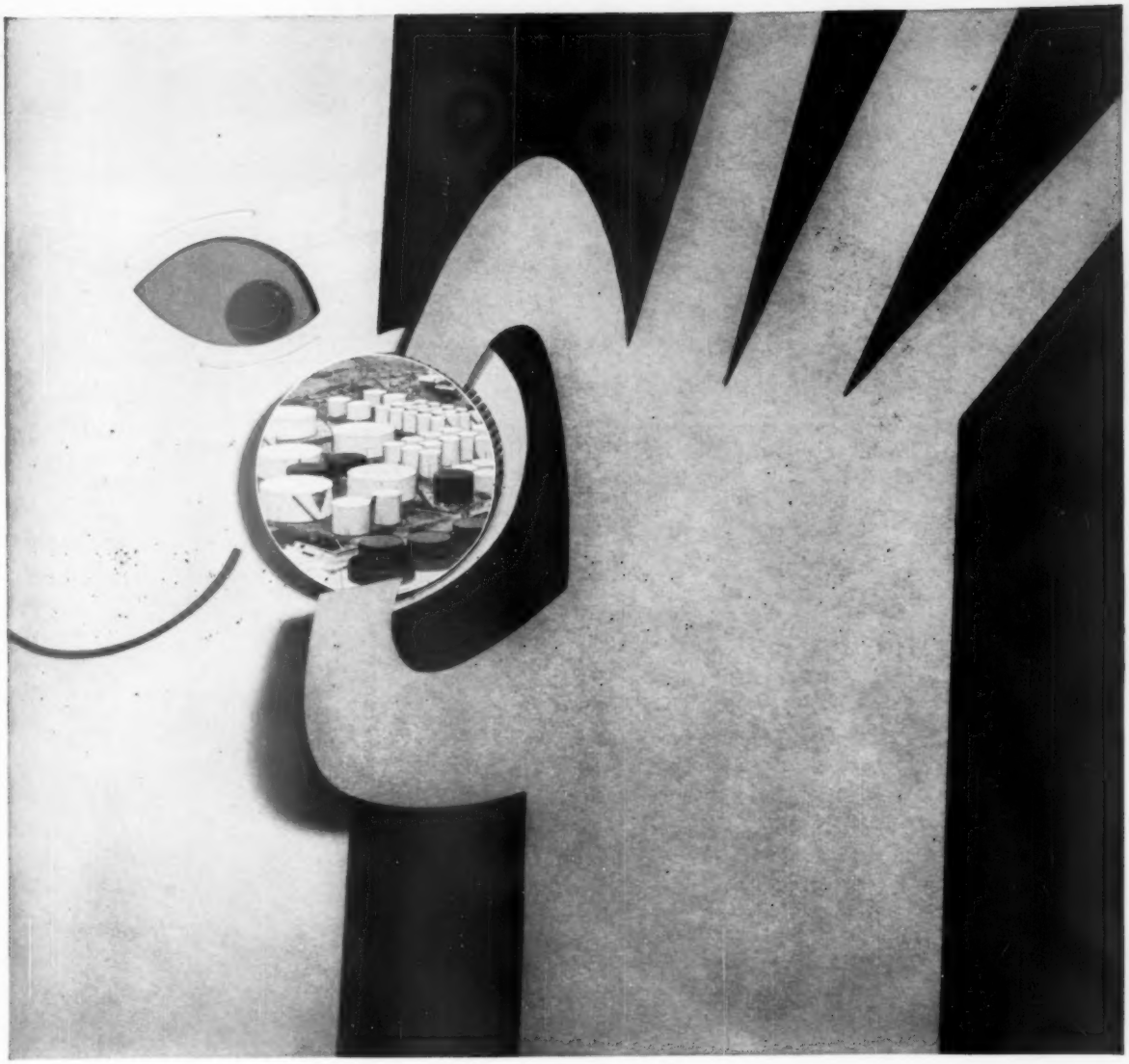
Project: 63 miles of 2-in., 12 miles of 3-in., 80 miles of 4-in., and 34 miles of 6-in.

Status: Pending FPC approval.

Completion:1960.

- **Iron Ranges Natural Gas Co.,** St. Paul.

Project: 79 miles of 10 and 12-in. from



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Only General American offers you complete tank storage facilities within 500 miles of *almost all* top American markets! Today six General American Terminals* provide nearly 16,000,000 barrels of storage capacity for all bulk liquids that can flow through pipelines.

Only General American Tank Storage Terminals give you all these benefits:

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***Carteret, N. J. (Port of New York), Chicago Ill., Corpus Christi, Texas (Port of Corpus Christi), Pasadena, Texas (Port of Houston), Galena Park, Texas (Port of Houston), Good Hope, La. (Port of New Orleans).**

GENERAL AMERICAN TANK STORAGE TERMINALS

GENERAL AMERICAN TRANSPORTATION *a division of* **CORPORATION**

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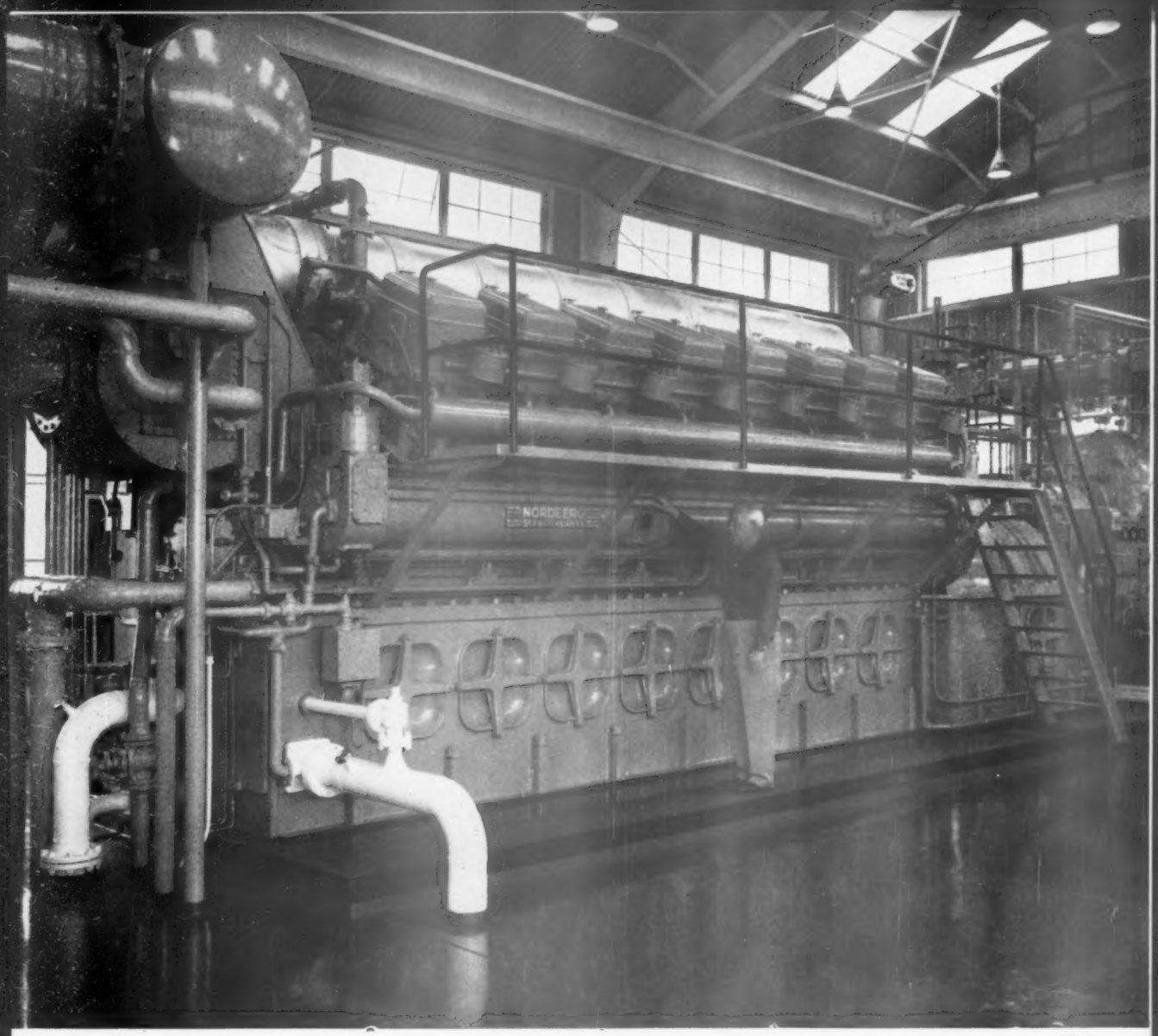
TANK STORAGE TERMINALS GENERAL AMERICAN TRADE MARK



0359-R

Pipe line engines by Nordberg

One of four Nordberg *Supairthermal*® spark-ignition gas engine-gear sets driving centrifugal compressors in Transcontinental Gas Pipe Line Corporation's Station No. 23.

NORDBERG MANUFACTURING COMPANY
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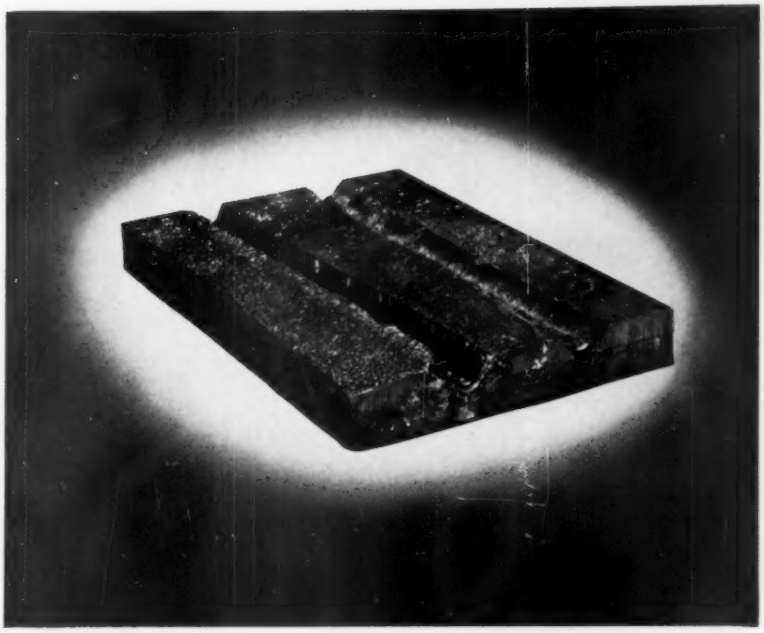
PIPELINE CONSTRUCTION

Grand Rapids to Hoyt Lake, Minn., and 67 miles of 12-in. from Duluth to Silver Bay, Minn.
Status: Approved by FPC.
Completion: 1960.

- **Iroquois Gas Co.**
Project: 9.5 miles of 16-in. in Erie County, New York.
Status: Pending FPC approval.
- **Kansas-Nebraska Natural Gas Co., Inc.,** Phillipsburg, Kans.
Project: 15½ miles of 12-in. main-line loop.
Status: Approved by FPC.
- **Laclede Gas Co.,** St. Louis, Mo.
Project: 107 miles of 24-in. between Hallsville, and St. Louis, Mo.
Status: Proposed.
- **Lone Star Gas Co.,** Dallas, Tex.
Project: 40 miles of 12-in. in Eastland and Callahan counties, Texas.
Contractor: Company crews.
Completion: May 1, 1960.
- **Michigan Wisconsin Pipe Line Co.,** Detroit, Mich.
Project: 188 miles of 30-in. and 341 miles of 24-in. main-line loop.
Status: Pending FPC approval.
Completion: By September 1, 1960.
Project: 80 miles of 20-in. main-line loop from East Dubuque to Janesville, Wis.
Status: Pending FPC approval.
Completion: November 1, 1960.
Project: 31 miles of 24-in. loop in Illinois; 17 miles of 24-in. loop in Indiana; and 18 miles of 24-in. loop in Michigan.
Status: Conditionally approved by FPC.
Completion: October 1960.
Project: 69 miles of 24, 28 miles of 20-in.; 96 miles of 16-in.; 29 miles of 8-in.; and 32 miles of 4-in. in Wisconsin.
Status: Conditionally approved by FPC.
Completion: October 1960.
Project: 65 miles of 24-in. loop in Kansas.
Status: Approved.
Completion: Summer 1960.
- **Midwestern Gas Transmission Co.,** Houston.
Project: 504 miles of 24-in. from Emerson, Man., to Marshfield, Wis., plus 54 miles of sales laterals.
Status: Approved by FPC.
Completion: 1960.
- **Mississippi River Transmission Corp.** (Mississippi River Fuel Corp.), St. Louis.
Project: 115 miles of 24-in. from near Oran in southeast Missouri, north between Ste. Genevieve and Bonne Terre into vicinity of Herculaneum and Pevely then into St. Louis County.
Status: Planned.
Completion: Last half 1960.
- **Natural Gas Pipeline Co. of America,** Chicago.
Project: 151 miles of 36-in. intermittent sections paralleling mainline facilities between Ford County, Kansas, and Joilet, Ill.
Status: Pending FPC approval.
Completion: Fall 1960.
Project: 180 miles of 24-in. between Kiowa County, Oklahoma, and Minneola, Kans.
Status: Pending FPC approval.
Completion: Fall 1960.
Project: 29 miles of 10 and 12-in. in Love County, Oklahoma.
Status: Under way.
Contractor: **R. H. Fulton & Co.,** Lubbock, Tex.
Completion: March 18, 1960.
- **Niagara Mohawk Power Corp.,** Syracuse, N. Y.
Project: 104 miles of 12-in. from Watertown, N. Y., to Massena, N. Y.
Contractor: **Fulghum Contracting Corp.,** Harrisburg, Pa.
- **Northern Natural Gas Co.,** Omaha, Neb.



Which cast iron groove was made in just 42 seconds?

The metal is cast iron. Grinding out the six inch groove on the right took 5 minutes, 36 seconds. Using the Arcair process the groove on the left was made in 42 seconds — **eight times faster!**

You can cut, gouge, bevel or groove **any** metal using the Arcair process — and get similar dramatic cost savings, with an investment of much less than $100.

HOW DOES ARCAIR WORK? The 1½-lb. torch utilizes Arcair COPPERCLAD electrodes, energized by current from a welding machine to melt the metal. Air from an 80-100 p.s.i. air line travels through the torch and out tiny holes in the head, pushing the metal ahead of the worked surface. Fifteen minutes instruction is all an operator needs.

WHAT'S YOUR PROBLEM? If you have a specific metal removal problem, or would like additional information, write us. Or, ask your welding supply distributor.

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Send me more information on ARCAIR TORCHES and COPPERCLAD ELECTRODES.

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MY PROBLEM

DOW | WEED AND GRASS KILLERS

WEEDS ARE A HAZARD YOU CAN'T AFFORD!

Avoid danger . . . spray them away with GARLON

Weeds and grasses have taken over this tank farm, hiding pipelines and valves, rusting fences, creating a fire hazard. Under old-fashioned methods, this would have meant weeks of steady work for an extra crew at prohibitive labor costs.

The modern, low-cost method—spray them away with Garlon*. And since Garlon can be applied anytime weeds are growing actively, you can do it at your convenience and spread your maintenance dollar over a longer period.

Garlon is easy to use, too. Simply add the required amount of water, mix, and you're ready to spray. Your own crew can do the job, or a professional contractor will do it for you. Re-treating on a spot basis is easy and inexpensive too.

It all adds up to lower-cost control of trouble areas like storage areas, pipelines, fences, sidings, drainage ditches, parking lots. And the cost gets progressively lower! Once you start a program of chemical vegetation control, you'll find fewer sprayings are required each year to knock out weeds and grasses.

*TRADEMARK

Hand-cutting costs stay constant from year to year

Chemical maintenance costs actually diminish each year

For more information on modern chemical vegetation control write: THE DOW CHEMICAL COMPANY, Agricultural Chemicals Sales Dept. 204DC1-25, Midland, Michigan.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

PIPELINE CONSTRUCTION

Project: 217 miles of main line, 221 miles of main-line loops, and 2,178 miles of branch lines of various diameters.

Completion: 900 miles were completed in 1959.

Project: 36.5 miles of 2 to 16-in. gathering lines at Otis gas field, Rush County, Kansas, for underground storage, and 36.7 miles of 30-in. transmission line connecting Otis storage area to main line at Bushton, Kans.

Status: Pending FPC approval.

Project: About 21 miles of 16-in. and 26 miles of various small diameter pipeline in the Glick field, Kansas, area in Kiowa, Comanche, and Barber counties.

Status: Pending FPC approval.

Project: 188 miles of 24-in. and 215 miles of 30-in. from Farmington, Minn., to International border.

Status: Proposed.

- **Ohio Oil Co.,** Findlay, Ohio.

Project: 20 miles of gathering line to move casinghead gas to proposed natural-gasoline plant in south central Michigan.

- **Oklahoma Resources Development Co.,** Cameron Building, Oklahoma City.

Project: About 170 miles of 12-in. trunk line from Oklahoma City to Harrah and Muskogee, Okla., and about 130 miles of 4 to 12-in. lateral from the Greasy Creek area of Hughes County and from Blaine and Logan counties.

Status: Planned.

Completion: November 1, 1960.

- **Pacific Gas & Electric Co.,** San Francisco.

Project: 120 miles of 34-in. looping of Topock-Milpitas main line.

Status: Planned. Pending FPC approval.

Completion: 1961.

Project: 11 miles of 20-in. from Pittsburg to Walnut Creek, Calif.

Contractor: Using company crews.

Completion: 1960.

Project: 296 miles of 36-in. from the California-Oregon border to Antioch, Calif. (This is part of the project to import natural gas from Canada, which will include the Pacific Gas Transmission project listed below.)

Status: Pending approval from governments.

Completion: 90 miles scheduled for completion in 1960, the rest in 1961.

- **Pacific Gas Transmission Co.** (Pacific Gas & Electric, San Francisco).

Project: 614 miles of 36-in. from Kingsgate, B. C., to California border near Klammath Falls, Ore.

Status: Pending approval of FPC and Canadian authorities to import gas.

- **Pacific Lighting Gas Supply Co.,** Los Angeles.

Project: 116 miles of 34-in. from Needles to Newberry, Calif.

Status: Under way.

Contractors: **Engineers Limited Pipeline Co.,** San Francisco, and **Pacific Pipeline Construction Co.,** Montebello, Calif.

Completion: August 1960.

- **Pacific Northwest Pipeline Corp.,** Salt Lake City, Utah.

Project: 18 miles of 20-in. and 40 miles of 16-in. from main line near Camas, Wash., to Salem, Ore.

Status: Pending before FPC.

Completion: 1960.

Project: 60 miles of 12-in. from Salem to Eugene, Ore.

Status: Planned.

Completion: 1960.

Project: 61 miles of 4, 6, and 8-in. gathering line in Big Piney field, Wyoming.

Status: Planned.

Completion: 1960.

Project: 9 miles of 12-in. gathering line in Red Wash field, Uintah County, Utah.

Status: Planned.

Completion: 1960.

- **Peoples Gulf Coast Natural Gas Pipeline Co.,** Chicago.

Project: 371 miles of 30-in. loop of present system between Texas and Chicago.

Status: Pending FPC approval.

Completion: 1960.

Project: 10.6 miles of 8-in. in Starr and Hidalgo counties, Texas.

Status: Pending FPC approval.

- **Peoples Natural Gas Co.,** Pittsburgh, Pa.

MR. SUPERINTENDENT

STOP PIPELINE LEAKS INSTANTLY

WITH PIPE GASKET PATCH BY DALLAS

WRITE FOR FREE LITERATURE AND INFORMATION ABOUT 25' TEST ROLL.

"Used by the largest Pipelines & Oil Companies."

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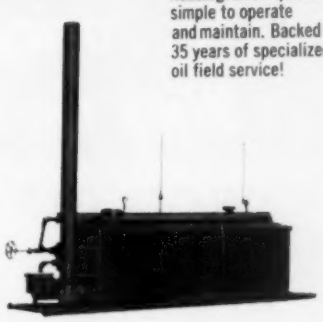

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SEMI-ENCLOSED — normal or medium slip, 3 phase, 60 cycle. Has prelubricated ball bearings in semi-enclosed protected housing, 40 degree C rise. Built for continuous duty. High Torque, low starting current. Extra insulating coating throughout.

TOTALLY ENCLOSED — Fan cooled, normal or medium slip, 3 phase, 60 cycle. Has prelubricated ball bearings, totally enclosed FAN cooled 55 degrees C rise, for continuous duty. High Torque — low starting current. Extra insulating coating throughout.

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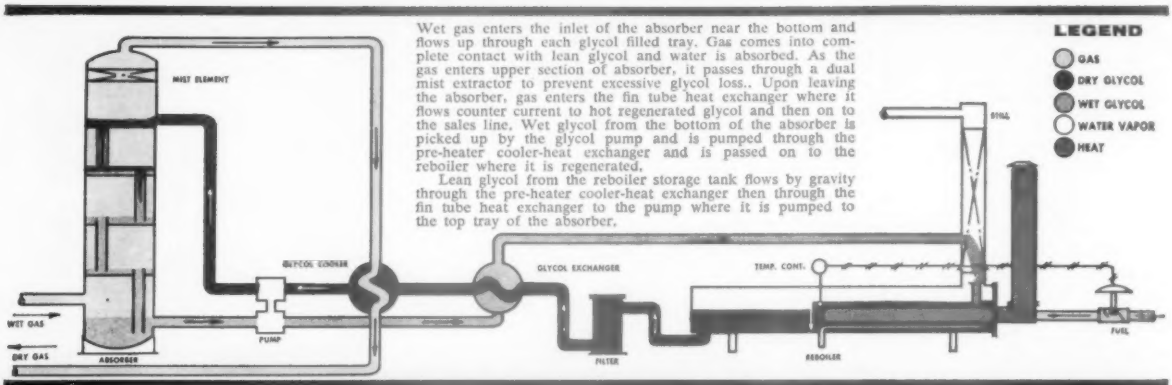
BETHLEHEM STEEL CO. Supply Division Tulsa, Oklahoma

Manufactured by Valley Electric Corporation, St. Louis 8, Mo.

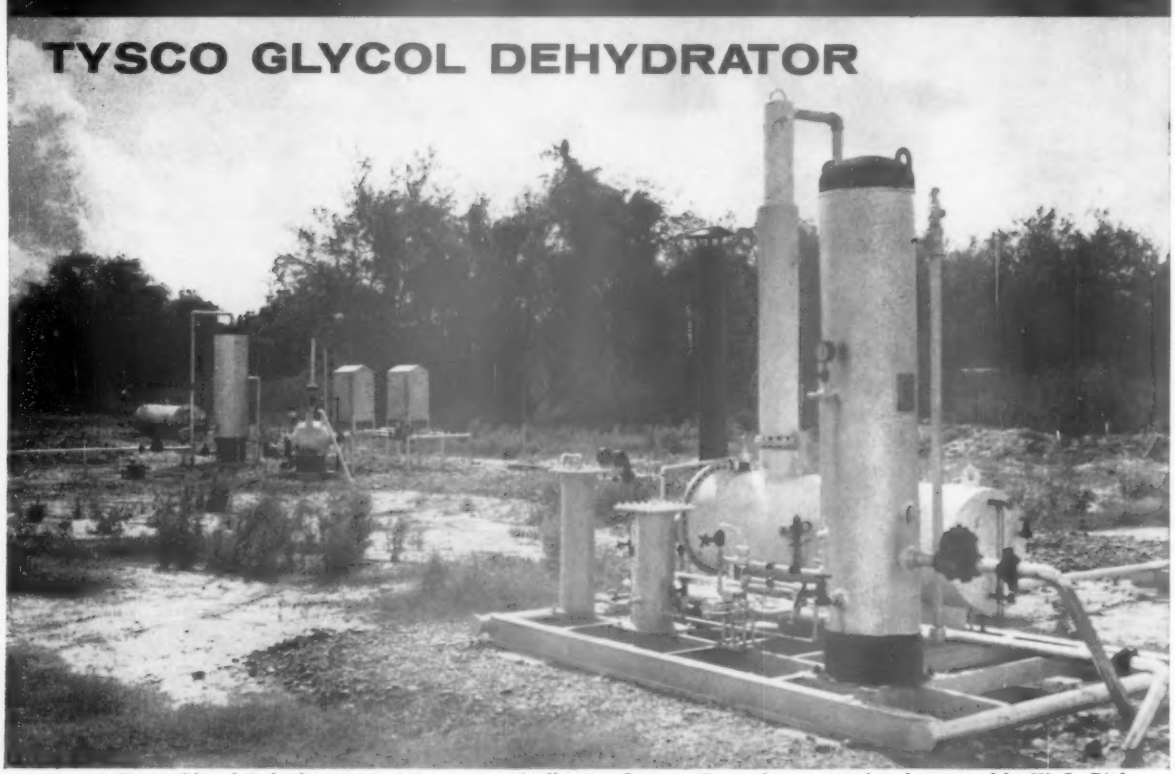


Wet gas enters the inlet of the absorber near the bottom and flows up through each glycol filled tray. Gas comes into complete contact with lean glycol and water is absorbed. As the gas enters upper section of absorber, it passes through a dual mist extractor to prevent excessive glycol loss.. Upon leaving the absorber, gas enters the fin tube heat exchanger where it flows counter current to hot regenerated glycol and then on to the sales line. Wet glycol from the bottom of the absorber is picked up by the glycol pump and is pumped through the pre-heater cooler-heat exchanger and is passed on to the reboiler where it is regenerated.

Lean glycol from the reboiler storage tank flows by gravity through the pre-heater cooler-heat exchanger then through the fin tube heat exchanger to the pump where it is pumped to the top tray of the absorber.

"... dries more gas with less glycol. With much less maintenance service."

TYSCO GLYCOL DEHYDRATOR



Tysco Glycol Dehydrator operating economically on a Lajoya, Texas, lease owned and operated by W. L. Pickens.

Tysco Glycol Dehydrators utilize an outside glycol to glycol pre-heater cooler to give maximum dew-point depression and the lowest possible operational cost. Pre-heater is mounted in series with a large gas to glycol fin tube heat exchanger. The main gas glycol fin tube heat exchanger is designed so that it gives a low glycol contact temperature. Gas is delivered with a water vapor content of never more than seven pounds per million standard cubic feet—*more often the water content is much less.* Glycol loss is less than one pint per million cubic feet of gas processed.

To find out how economical a Tysco Glycol Dehydration Unit is to own and operate, call your Tysco sales engineer, or write:

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PIPELINE CONSTRUCTION

Projects: 38 miles of 12 and 20-in. in various parts of Pennsylvania.
Status: Planned.
Completion: 1960.

- **Pioneer Natural Gas Co.,** Amarillo, Tex.
Project: 21 miles of 12-in. from Sudan to Muleshoe, Tex.
Status: Pending FPC approval.
Project: 12 miles of 10-in. from Muleshoe, Tex., northward.
Status: Pending FPC approval.
- **Public Service Co. of North Carolina,** Gastonia, N. C.
Project: About 47 miles of 4, 8, and 10-in. in North Carolina.
- **Rocky Mountain Natural Gas Co.**
Project: 65 miles of gas line in southwestern Colorado to supply Collbran, Montrose, Delta, and Orchard City.
Status: Planned.
- **Shamrock Oil & Gas Corp.,** Amarillo, Tex.
Project: 70 miles of 16-in. from Ochiltree to McKee in the Texas Panhandle, to move wet gas to a plant where liquids will be removed.
Completion: June 1, 1960.
- **South Texas Natural Gas Gathering Co.** (Coastal States Gas Producing Co., Corpus Christi, Tex.)
Project: A 60-mile line from existing system to steam generating plant in Pearsall County, Texas.
Completion: January 1960.
Project: 125 miles of 8, 10, 14, 18, and 20-in. line in Jimm Hogg County, Texas.
Status: Under way.
Contractor: **O. R. Burden Construction Corp.,** Tulsa.
- **Southern California Gas Co.,** Los Angeles.
Project: 13 miles of 34-in. from San Fernando Valley (Los Angeles) to West Los Angeles.
Status: Approved.
Completion: 1960.
- **Southern California Gas Co.** and **Southern Counties Gas Co. of California,** Los Angeles.
Project: 93 miles of 34-in. from Ivanpah (near California-Nevada border) to Newberry, Calif.
Status: Pending FPC approval.
Completion: 1961.
Project: 115 miles of 36-in. from Newberry to Placentia, Calif.
Status: Pending federal and state approval.
Completion: August 1960.
- **Tennessee Gas Pipeline Co.**
Project: 21 miles of 16-in. gathering line from Louisiana coast to Block 46 in the Vermilion area.
Status: Pending FPC approval.
Project: 2 miles of 12-in. gathering line from Block 66 to Block 64, East Cameron area, offshore Louisiana.
Status: Pending FPC approval.
Project: 158 miles of 36-in. gas loop at various points between Kinder, La., and Centerville, Tenn.
Status: Approved by FPC.
Project: 41 miles of 30-in. loop east of Hamburg, N. Y.
Status: Pending FPC approval.
Project: 25 miles of 30-in. loop near Kane, Pa.
Status: Pending FPC approval.
- **Texas Eastern Transmission Corp.,** Shreveport, La.
Project: 85 miles of 24-in. from Tamarack, to Perulack, Pa.
Status: Pending FPC approval.
Project: 40 miles of 36-in. from Lambertville, to Linden, N. J.
Status: Pending FPC approval.
Project: 23 miles of 20-in. from Eagle, to Chester Junction, Pa.
Status: Pending FPC approval.
Project: 3 miles of 30-in. from Linden, to Staten Island, N. J.
Status: Pending FPC approval.
Project: 65 miles of 30-in. from Perulack, Pa., to Lambertville, N. J.
Status: Pending FPC approval.
- **Texas Electric Service Co.,** Fort Worth, Tex.
Project: 200-mile 22 or 24-in. line from Old Ocean field, Brazoria County, Texas, to Fort Worth, and 70-mile 16-in. line from there to Graham, Tex.
Status: Planned.
- **Transcontinental Gas Pipe Line Corp.,** Houston, Tex.
Project: 69 miles of 30-in., 211 miles of 36-in., and 7 miles of 16-in. in various states.
Status: Pending FPC approval.
Completion: 1960.
Project: 83 miles of 30-in. and 152 miles of 36-in. in various states.
Contractors: **Williams Brothers Co.,** Tulsa, has contract for 23 miles of 30-in. near DeQuincy, La.; and **Panama-Williams Corp.,** Houston, has contract for 15 miles of 30-in. near Houston.
Status: Under way on 30-in. line.
Completion: 1960.
Project: 13 miles of 24-in. and 40 miles of 8 to 20-in. Louisiana purchase laterals.
Status: Approved by FPC.
Completion: 1960.
- **Transwestern Pipeline Co.,** Houston.
Project: 490 miles of 24 and 20-in. from Texas to Roswell, N. M., and 670 miles of 30-in. from Roswell to Topock, Ariz., near the California border. Also, 300 miles of 10, 12, and 16-in. lateral lines in Texas and New Mexico.
Status: Under way.
Contractors: **Houston Contracting Co.,** Houston, and **H. C. Price Co.,** Bartlesville,

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PIPELINE CONSTRUCTION

Okla., have joint contract to build the main line. Houston Contracting will build 149 miles of 30-in. from Corona, N. M., west to McCartys, N. M.; 55 miles of 30 and 89 miles of 24-in. from Corona east to Roswell and southeast to Carlsbad; 61 miles of 20 and 76 miles of 24-in. from Fort Stockton, Tex., to Carlsbad; and 166 miles of 24-in. from Roswell northeast to Dawn, Tex. Price will handle two main-line spreads totaling 335 miles in Arizona. As for the 300 miles of laterals, Houston Contracting will carry out this work with **R. H. Fulton & Co.,** Lubbock, Tex.. and **Western Pipe Line, Inc.,** Austin, Tex. Western will build 100 miles of 10, 12, and 16-in. in West Texas and New Mexico.

Completion: June 1960.

Project: 300 miles of 4, 6, and 8-in. gathering lines in the Texas Panhandle, northwestern Oklahoma, Southwest Texas, and southeastern New Mexico. This project is in conjunction with the 1,160-mile Texas-California line (see above).

Contractor: **Sheehan Pipe Line Construction Co., Tulsa.**

- **Trunkline Gas Co.,** Houston, Tex.

Project: 24.5 miles of 12-in. gathering line from Lowry, to Cameron Parish shoreline, Louisiana.

Status: Under way.

Contractor: **Sam Carline, Inc.,** Berwick, La.

Project: 42 miles of 24-in. loop from west of Moss Hill, to Silsbee, Tex.

Status: Under way.

Contractor: **Sharman, Allen, Gay & Taylor, Inc.,** Houston.

Project: 53 miles of 30-in. loop from Pitkin, to Pollock, La.

Status: Under way.

Contractor: **Grayco Constructors, Inc.,** Austin, Tex.

Project: 61 miles of 30-in. loop from Pollock, to Riverton, La.

Status: Under way.

Contractor: **APV Co., Inc.**

Project: 177 miles of 30-in. loops in Louisiana, Arkansas, Mississippi, Tennessee, and Kentucky.

Status: Under way.

Contractor: **Panama, Inc., Houston.**

Project: 62 miles of 26-in. extension from Bourbon to Rossville, Ill.

Status: Under way.

Contractor: **Contracting & Material Co.,** Evanston, Ill.

Project: 137 miles of 26-in. extension from Rossville, Ill., to Vistula, Ind.

Status: Under way.

Contractor: **Engineers Limited Pipeline Co.,** San Francisco, Calif.; **Bechtel Corp.,** San Francisco, has the double-jointing contract.

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Canadian Crude Oil Pipelines

- **Act Oils, Ltd.**

Project: A 450-mile line from the Peace River region of northern B. C. to tidewater at Kitimat, B. C.

Status: Proposed.

- **Bituminous Oil Pipeline Co.** (Royalite Oil Co., and Can-Amera Oilsands Development, Ltd.)

Project: A 250-mile line from Athabasca oil sands in northeastern Alberta to Edmonton.

Status: Proposed.

- **Independent Pipe Line Co.** (Home Oil Co.), Calgary.

Project: 1,073 miles of 36-in. from Edmonton, Alta., to Superior, Wis.; 946 miles of 34-in. from Superior to Montreal, Que.; 72 miles of 16-in. and 74 miles of 10-in. feeder lines from Calgary to Bellshill Lake, Alta., on the 36-in. line.

Status: Proposed.

- **Mid-Continent Pipe Lines, Ltd.,** Edmonton, Alta.

Project: 1,500 miles of 30-in. from Edmonton to Chicago, via Saskatchewan, North Dakota, Minnesota, Wisconsin, and Illinois. U .S. section to be owned by International Oil Pipeline Corp., New York City.

Status: Pending Canadian Board of Transport Commission approval. W. C. Gilman & Co., New York City, has made preliminary study.

- **Peace River Oil Pipe Line Co., Ltd.,** Calgary, Alta.

Project: 233 miles of 8-in. to move crude from the Milligan Creek area of British Columbia to Trans Mountain Pipe Line in Alberta. The new line will connect with the Peace River system near Valleyview, Alta.

Status: To get under way early in 1960.

Completion: Possibly in the fall 1960.

Project: 8 miles of 6-in., 45 miles of 8-in., and 17 miles of 12-in. from its Fox Creek Pump Station to Windfall, Virginia Hills, and Swan Hills fields in Alberta.

Status: Approved.

- **Rangeland Pipe Line Co.,** Calgary.

Project: 111-mile line from Cessford field to Calgary.

Status: Pending approval of Alberta government.

- **Trans-Prairie Pipelines, Ltd.,** Edmonton, Alta.

Project: 6-8-in. line from Weyburn field to Regina and Moose Jaw, Sask.

Status: Proposed.

Canadian Products Pipelines

- **Foothills Products Pipe Line, Ltd.** (Pembina Pipe Line Co., Mannix Co., Ltd.), Calgary, Alta.

Project: Gathering system to connect Al-

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WATER PIPELINES

PIPELINE CONSTRUCTION

berta gasoline plants to trunk line from Alberta to Pacific Coast.

Status: Proposed.

Project: A line to carry sulfur, propane, and butane from the Calgary, Alta., area to Milwaukee.

Status: Under study.

- **Hydrocarbons Pipeline Co.,** Winnipeg, Man.

Project: 800 miles of 6, 8-in. LPG line from near Edmonton to Fort William, Ont.

Status: Has Parliament of Canada approval. Seeking approval of Federal Board of Transport Commissioners and the Alberta Petroleum and Natural Gas Conservation Board.

Contractor: **Dutton - Williams Brothers, Ltd., Calgary,** and **A. D. Little Co., Boston,** are consultants.

- **Pembina Pipe Line, Ltd.,** Edmonton, Alta.

Project: A 1,200-mile line to carry sulfur, LPG, and natural gasoline from Alberta's gas fields to eastern Canada.

Status: Proposed.

Canadian Natural Gas Pipelines

- **Alberta Gas Trunk Line Co., Ltd.,** Calgary.

Project: 256 miles of 36-in., 75 miles of 30-in., 55 miles of 26-in., 199 miles of various diameter gathering lines, and 42 miles of 16-in. delivery lateral. Main line is from Berland River, Alta., to Crows Nest Pass.

Status: Approved by Alberta government. Work to start at the beginning of the 1960 construction season. Line may be in operation by the end of 1961.

Project: 65 miles of 24-in., 10 miles of 12-in., 24 miles of 6-in., and 2 miles of 4-in.

Status: Planned.

Completion: 1960.

- **Alberta Natural Gas Co., Ltd.** (Pacific Gas & Electric Co., San Francisco, and Westcoast Transmission, Calgary).

Project: 108 miles of 36-in. across southeastern British Columbia to U. S. border near Kingsgate, B. C.

Status: Pending approval of Canadian and U. S.regulatory agencies.

- **British Columbia Electric Co.,** Vancouver.

Project: 35 miles of 30-in. from Huntington, B. C., to Vancouver.

Completion: 1960.

- **Cartier Gas Corp.** (St. Maurice Gas, Inc. and Consumers' Gas Co., Toronto).

Project: 170 miles from Montreal to Quebec City.

Status: Proposed.

- **Northern Natural Gas Co., Omaha.**

Project: 73 miles of 20-in. from Savanna Creek to Pincher Creek, Alta.

Status: Planned.

Project: 32 miles of 24-in. from Pincher Creek to Montana border to tie in with planned U. S. line on to Minneapolis.

Status: Planned.

- **Quebec Gas Transmission Lines, Inc.,** 1610 Sherbrooke St. W., Montreal.

Project: 300-mile line from Montreal to Quebec City.

Status: Proposed.

- **Trans-Canada Pipe Lines, Ltd.,** Toronto.

Project: 74 miles of 34-in. main-line loop (Burstall to Winnipeg, Man.) and 51-mile 30-in. lateral from Emerson, Man., to U. S. border near Noyes, Minn., to connect with proposed Midwestern system now before U. S. FPC.

Status: Pending government approval.

Completion: Fall 1960.

Project: An additional 390 miles of 34-in. main-line loop between Burstall and Winnipeg, Man.

Status: Planned. About 268 miles scheduled for construction in 1961, and 122 miles in 1962.

- **Van Tor Oil & Exploration Co.,** Vancouver, B. C.

Project: Line from British Columbia mainland to Vancouver Island.

Status: Proposed.

- **Westcoast Transmission Co., Ltd.,** Calgary.

Project: (See Alberta Natural Gas Co., Ltd., for joint project).

Project: 250 miles of 30-in. from Taylor to Fort Nelson, B. C.

Status: Planned.

Foreign Crude Oil Pipelines

- **Arab Pipeline.**

Project: 1,250-mile pipeline from the Persian Gulf to Mediterranean serving fields in Saudi Arabia, Kuwait, Iran, Iraq, and Syria.

Status: Proposed by Saudi Arabian Government as project of Arab countries, and approved by the Arab League's petroleum department.

- **Arabian American Oil Co.,** Dhahran, Saudi Arabia and N. Y. C.

Project: 18 miles of 34, 36-in. from Qatif to Ras Tanura.

Status: Planned.

Contractor: Company personnel.

Completion: July 1, 1962.

Project: 6 miles of 30-in. from Ras Tanura to Ras Tanura terminal; 4 miles of 14-in. from Buqqa to QA-2 pipeline.

Status: Planned.

Contractor: Company personnel.

Completion: October 1, 1960.

- **Barnabos Group** (Italian interests).

Project: A line from Venice, Italy, to

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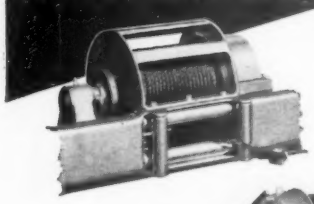

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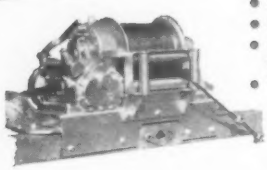
- heavy-duty pipe bumper
- needle-bearing, universal-joint spline-shaft drive assembly
- Timken bearings on worm



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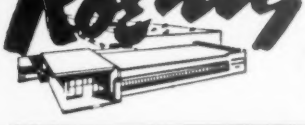

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- A complete line to meet pumping requirements

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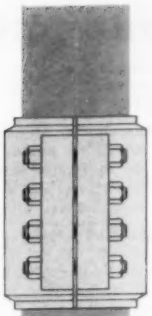
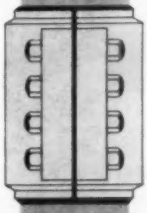
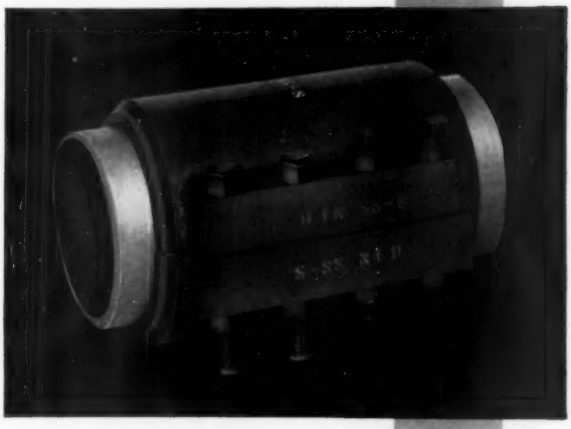


Completed Installation



Completed Installation (When welding is Specified)



The Smith Split-Coupling can be used as coupling, repair clamp or split sleeve.
Easy installation—Place halves around pipe. Tighten side bolts.
Permits welding while pumping.
Available in standard pipe sizes.
Extra lengths and special dimensions on application.

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PIPELINE CONSTRUCTION

Innsbruck, Austria, which could then be extended to Munich, Germany.
Status: Planned.

- **Basrah Petroleum Co.**
  Project: 65 miles of 30 and 32-in. from Zubair to Fao in southern Iraq.
  Contractor: **Turriff-Burden, Ltd.**, Tulsa.
  Completion: 1961.

- **Bolivia-Paraguay.**
  Project: 500 miles of 6-in. from Southeast Bolivia to a proposed refinery on Paraguay River, and later to Asuncion.
  Status: Planned.

- **Cie. des Transports par Pipe-Lines au Sahara** (subsidiary of Cie. de Recherches et d'Exploitation de Petrole au Sahara), Paris.
  Project: 470 miles of 24-in. from Edjele fields in Sahara to the Tunisian Mediterranean Coast.
  Contractors: **Groupement des Societes Entrepose et Parisienne pour l'Industrie Electrique en vue de l'Etude et de la Construction de Pipe-Lines**, and **Ste. des Grands Travaux de Marseille.** Engineering firm on the job is **Bechtel Mediterraneenne** S. A. (subsidiary of **Bechtel Corp.**, San Francisco).
  Completion: End of September 1960.

- **Creole Petroleum Corp.**, Caracas, Venezuela.
  Project: About 8 miles of 12, 20, and 24-in. gathering line in Lake Maracaibo.
  Status: Planned.
  Completion: December 1960.

- **Eastern Block Council for Mutual Economic Aid.**
  Project: 2,500-mile "Vomecon" pipeline from the Volga-Ural oil fields in Russia to East Germany, Poland, Czechoslovakia, and Hungary. The system will originate at Kuybyshev on the Volga River and will split into two branches at the Dneiper River, one going to Poland and Germany, the other to Czechoslovakia and Hungary. Expected capacity, 300,000 bbl. daily.
  Status: Construction under way in Czechoslovakia, with completion of this section by early 1961.

- **Elburz Oil Corp.**
  Project: 1,000 miles of 38-in. to move Qum crude to the Mediterranean.
  Status: Under way.

- **Empresa Nacional de Petroleo,** Chilean Government company.
  Project: 35-mile 8-in. outlet for fields in the Punta Delgada area of Magallanes Province.
  Status: Under way.
  Completion: March 1960.

- **ENI (Italian state oil agency)** and **Italo-Swiss Finance Co.**
  Project: A 700-mile system from Genoa to Aigle, Switzerland, thence northeast to the German border, where it would split with one branch going to Munich and another branch to the Karlsruhe area. Feeder lines would go to Turin, Milan, and Cremona, Italy.
  Status: The trunk line from Genoa to Aigle has been approved by the Italian Government.

- **Iranian Oil Participants, Ltd.**
  Project: 30 miles of 20-in. and 22 miles of 16-in. looping of Agha Jari to Bander Mashur line.
  Status: Planned.
  Project: 99 miles of 26, 28, and 30-in. from Gach Saran field to new terminal at Kharg Island in the Perisan Gulf.
  Contractor: A joint venture of **Raymond Concrete Pile Co.** and **Williams Bros. Co.**, Tulsa, **Richard Costain, Ltd.**, and **John Brown, Ltd.**, London, and **Werkspoor & Bredoro**, The Netherlands.

- **Iraq Petroleum Co.**, London.
  Project: 20 miles of 30-in. from the Lebanon-Syrian border to Tripoli.
  Contractor: **Contracting & Trading Co.**, Beirut, Lebanon.
  Completion: April 1960.
  Project: 250 miles of 30 and 32-in. in northern Iraq from Kirkuk to the Syrian border.
  Contractor: **Turriff-Burden, Ltd.**, Tulsa.
  Status: Under way.
  Completion: 1961.

- **Israel Government.**
  Project: 16-in. loop of 8-in. line on 235-mile Gulf of Aqaba-Haifa system.
  Status: Proposed.
  Project: Replace 125 miles of 8-in. from Elath to Beersheba with 16-in.
  Status: Under way.
  Completion: Mid-1960.

- **Libya.**
  Projects: Several companies have been studying the possibility of building pipelines to move crude from newly discovered fields in Libya to the Mediterranean Coast. These include the Conorada Group, Jersey Standard, and Caltex.

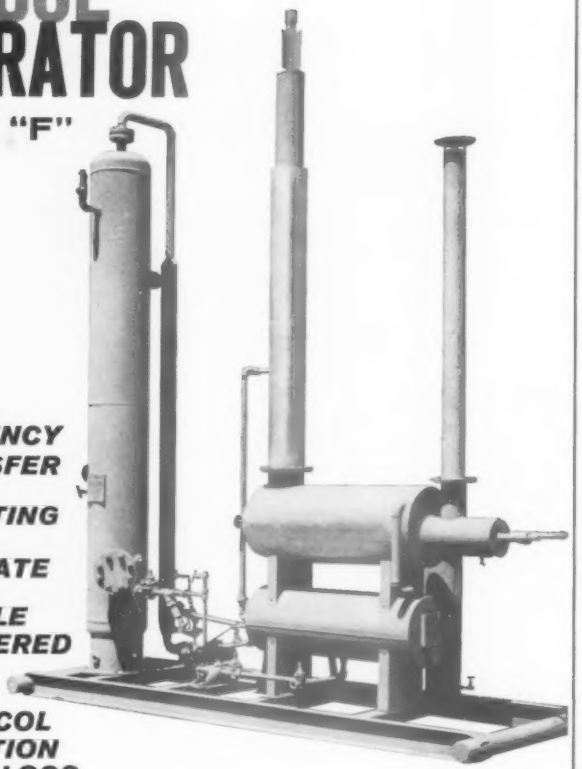
- **Oil India Private Ltd.** (Burmah Oil Co. and Assam Oil Co., two-thirds, and India Government one-third).
  Project: 720 miles of line in northeast India. This would include 260 miles of 16-in. from Nahorkatiya to Noonmati (site of proposed refinery), and 460 miles of 14-in. from Noonmati to Barauni (site of another proposed refinery).
  Status: Bids received January 7, 1960.
  Completion: 1962.

- **Pan American International Oil Co.**, New York.
  Project: 84-mile 12 to 14-in. line from

MORAN

GLYCOL DEHYDRATOR

TYPE "F"



HIGH EFFICIENCY HEAT TRANSFER

LOWER HEATING AND PUMPING RATE

DEPENDABLE GLYCOL-POWERED PUMP

HIGHER GLYCOL CONCENTRATION . . . MINIMUM LOSS

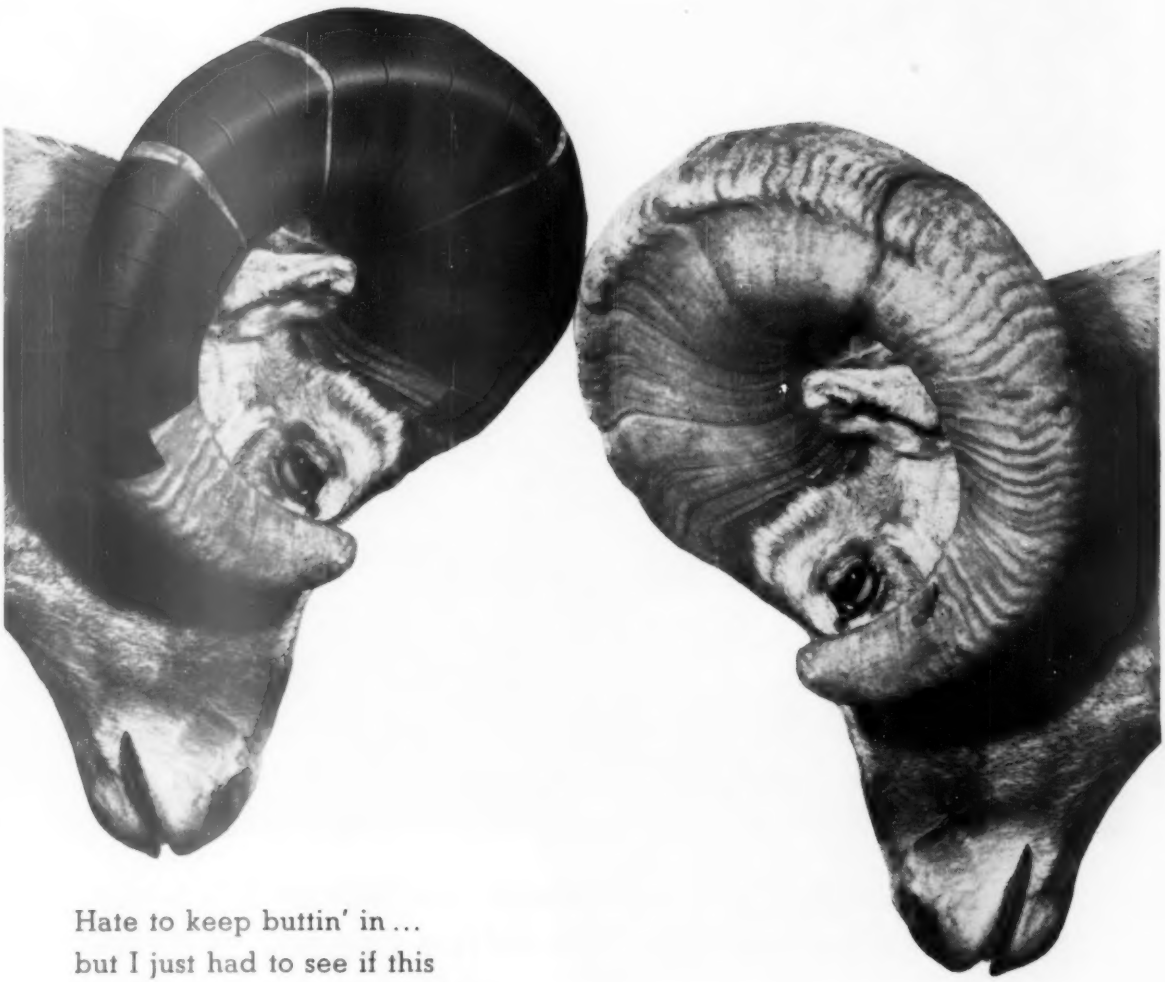
REFINERY TYPE BUBBLE TRAY ABSORBER

Write for full information on Moran glycol dehydrators and other oil field processing equipment.

MORAN TANK COMPANY, INC.

POST OFFICE BOX 7006 TELEPHONE 4-5334 SHREVEPORT, LOUISIANA

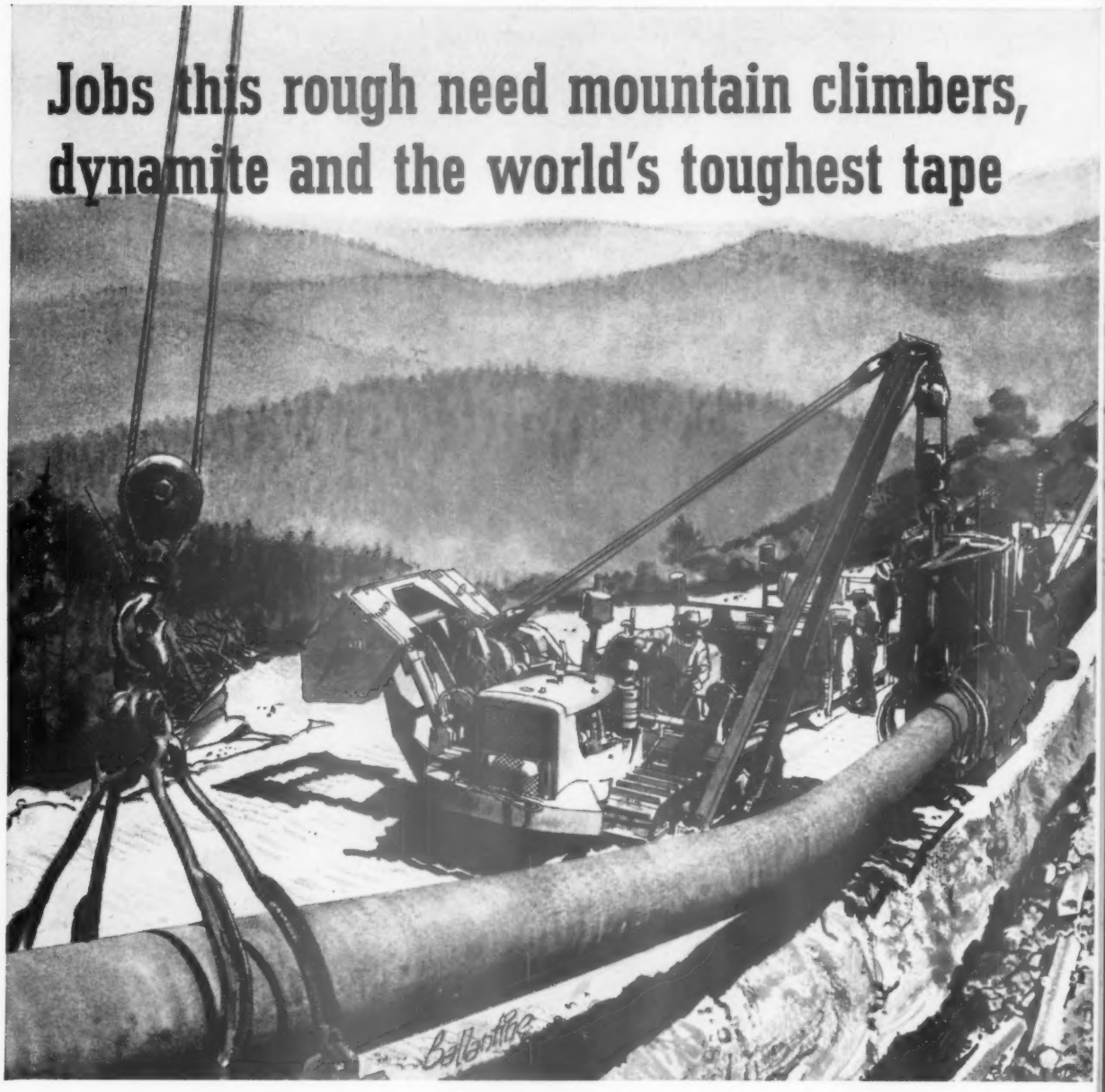
HEATERS • TREATERS • SEPARATORS • DEHYDRATORS • TANKS



Hate to keep buttin' in ...
but I just had to see if this
Polyken Tape was as tough as
they claim on the next page.

It's the toughest I've ever
come up against!

Jobs this rough need mountain climbers, dynamite and the world's toughest tape



New Mandalay line goes through solid rock, up 40% grades, over 8,000-ft. mountains—with Polyken protection all the way

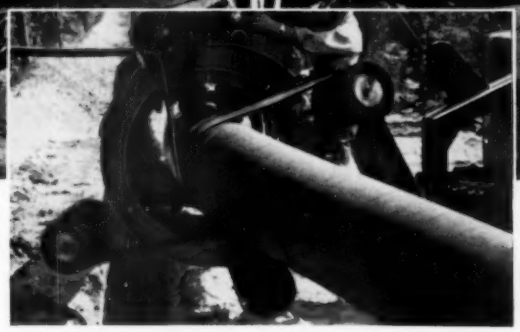
Before they took on 50 grueling miles of treacherous southern California mountains, the Richfield Oil Company people gave their materials a pretty thorough going over. Among other things, they made doubly certain of their protective coating.

Most Practical Protection Yet

They used Polyken's latest development, Extra Strength No. 960 Pipeline Roll. Like a lot of other large companies in recent years, they discovered that Polyken is the toughest, most practical protection you could ask for in modern pipe coating.

Many Hundreds of Miles of Proof

Who are these other companies? There's the Houston Texas Gas and Oil Corporation. They put Polyken tape on 1600 miles of gas line from Louisiana to Florida. The National Iranian Oil Company used Polyken for 200 miles of desert and mountain line. Phillips Petroleum put Polyken on several hundred miles of line in Texas and Canada. Jagged rock, coral swamp,



Using tensioned-spindle equipment, pipe is cleaned and wrapped in one factory-smooth operation. Polyken Tape is ready. No primer, no drying or cooling. No fumes or fire hazards.

burning sand and frozen ground—Polyken is at its best under the worst conditions.

The Question to Ask

When you start inquiring, be sure to ask these companies about relative costs. Compare Polyken with hot dope, and see for yourself how much they saved.

The Polyken method gets more footage *per day*, with far fewer men. With far less equipment and hauling costs. In fact, you have fewer problems all around—and enduring protection.

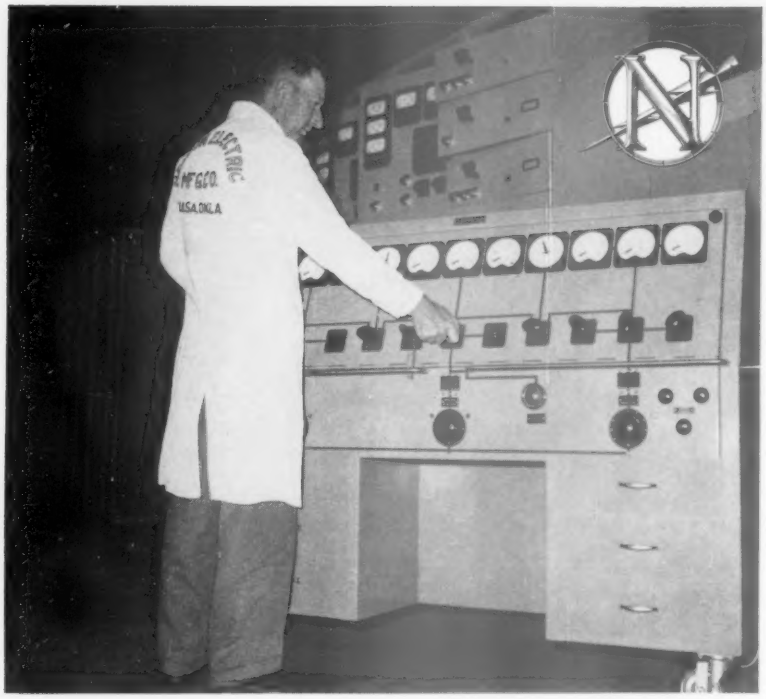
To get the complete details on savings and durability, check with your Polyken representative or call the Polyken Tape Coating Distributor nearest you. Or simply write Polyken, 309 West Jackson Blvd., Chicago 6, Ill.

THE MODERN WAY

Polyken®

EXPERIENCED IN PROTECTIVE COATINGS

THE KENDALL COMPANY
Polyken Sales Division



NELSON SWITCHBOARD TESTING ASSURES PERFECT OPERATION

Nelson makes certain at the factory that your switchboards and switchgear will work right. This quality control is now possible because the . . .

NEW NELSON SWITCHBOARD TESTER DUPLICATES FIELD OPERATING CONDITIONS

Developed by Nelson to test metering and relaying circuits of completed switchgear before shipment, this device tests potential and current circuits.

The performance of the switchboard is accurately measured. Gone is the guesswork of the old-fashioned continuity tests that showed only whether or not the switchgear was wired as shown on the wiring diagram.

This test gives both Nelson and the customer the satisfaction of KNOWING that the equipment is *right* as it leaves Nelson's plant, and is going to function in the field when properly installed.

a major source of electrical control equipment for industry

NELSON *Electric* MANUFACTURING CO.
TULSA, OKLAHOMA

PIPELINE CONSTRUCTION

Comodoro Rivadavia field to Argentina's Atlantic Coast.
Status: Under way.
Contractor: **Sharman, Allen, Gay & Taylor, Inc.,** Houston, Texas.
Completion: February 1960.

- **Petroleo Brasileiro S. A. (Brazil).**
Project: 35 miles of 8 to 12-in. pipe from Buracica to Candeia.
Contractor: **Techint, Inc.,** Milan, Italy.
Project: 70 miles of 22-in. from Sao Sebastiao to Cubatao.
Status: Pending approval.
Contractor: **Techint, Inc.,** Milan, Italy.
Project: 80 miles of 24-in. to tie in to proposed Caxias refinery near Rio de Janeiro.
Status: Planned.

- **Rotterdam-Rhine Pipeline Co.** (N.V. Rotterdam-Rijn Pijpleiding Mij., owned 40% by Royal Dutch-Shell, 20% by Caltex, and 40% by Galsenberg & Mobil Oil Sales & Distribution Co.)
Project: 183 miles of 24-in. from Pernis, the port of Rotterdam, extending to Venlo, Holland, where it branches into one line to Wesel and a second to Godorf and Wesseling, Germany. The branch to Wesel connects with a 16-in. line to Gelsenkirchen.
Status: Under way.
Contractors: **Bechtel International Co.** is construction manager of the project which is being constructed by a group of Dutch and German contractors.
Completion: June 5, 1960.

- **Royal Dutch-Shell.**
Project: 161 miles 20-in. line from Tandzung field to Balikpapan refinery, Borneo.
Status: Planned.
Contractor: **Williams Brothers Overseas, Ltd.,** Tulsa, and **John Brown, Ltd.,** London.
Completion: January 1, 1962.

- **South European Pipeline Co.** (Jersey Standard, Caltex, Shell, British Petroleum, and 12 other firms.)
Project: 419 mile 30-in. line from Lavers, near Marseille, to Strasbourg, with 40-mile extension to Karlsruhe, Germany.
Status: Construction to get under way by January 1961.
Completion: 1962.

- **Superior Oil Co.,** Los Angeles.
Project: A 16 and 24-in. line from its Lake Maracaibo, Venezuela, production to shore.
Status: Planned.
Contractor: **Pipe Line Technologists, C.A.,** Maracaibo, has design.

- **Syrian Pipeline,** Damascus.
Project: 500-mile line from Karshuk field, Syria, to Mediterranean.
Status: Proposed.

- **Union of Soviet Socialist Republic.**
Project: 2,315 miles of 28-in. Trans-Siberian crude-products line from Ufa Tuimaza fields in Bashkiria to Irkutsk near Lake Baikal.
Status: Under way.
(See Eastern Block for information on new East Europe line).

- **Yacimientos Petroliferos Fiscales (Argentina),** Buenos Aires.
Project: 390 miles of 14-in. from fields in Neuquen Province, Argentina, to Bahia Blancha on the coast.
Status: Bids requested.
Project: 625 miles of 12-in. from Mendoza to San Lorenzo.
Status: Planned.

- **Yacimientos Petroliferos Fiscales Bolivianos,** La Paz.

NEWS FROM DOWN THE LINE!

WmSON STOPPLES USED BY MAJOR GAS COMPANY TO KEEP TOWN "ON STREAM"

❶ "Our problem is to install a block valve and swaged tee on our 16" main without shutdown. This is possible with WmSon Tapping and Stopple equipment."

❷ "We made two 16" Stopple taps and two 8" by-pass taps with a WmSon-Hillco Tapping Machine through WmSon Sandwich Tapping Valves. These valves are temporary and are bolted to split tees which were welded on the line."

❸ "This Stopple plugging machine and the other one down the line were placed on the 16" Sandwich Tapping Valves and sealing elements were positioned inside the main line. The flow was then completely diverted through the by-pass."

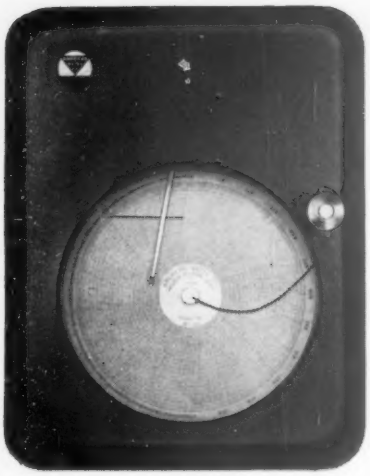
❹ "We removed the isolated section of line and, now, we lower the new section into place. When this new section is welded, Stopples are removed, Lock-O-Ring plugs are installed and tapping valves recovered. The entire job is done without shutdown or loss of pressure."

❺ "This job is typical of Stopple jobs which are taking place in pipeline, plant and refining operations here and abroad. WmSon Tapping and Stopple equipment is available for purchase or rental."

T.D. Williamson, Inc.
P. O. BOX 40 • TULSA 2, OKLAHOMA

REPRESENTATIVES AROUND THE WORLD

PIONEERS OF PIPELINE EQUIPMENT



AMERICAN®

PRESSURE and TEMPERATURE RECORDERS

American® single and two-pen *Pressure Recorders* for pressures from 30 inches vacuum to 10,000 psi.

- Pressure elements individually calibrated over full range.
- Variety of chart drives available.
- Helical elements of different ranges are interchangeable.
- Stainless steel pen arms with span and linearity adjustments.
- Aluminum dust and moisture-proof case.

American® *Temperature Recorders* for an accurate record of flowing temperatures.

- No ambient temperature errors.
- High sensitivity and torque—fast speed of response.
- Standard 0-150°F. range. Other ranges available by request.
- 24-hour mechanical or 110-v. 60-cy. electric chart drives.

Ask for Bulletins 400 and 408

AMERICAN®
METER COMPANY
INCORPORATED (ESTABLISHED 1836)
General Offices: Philadelphia 16, Pa.
Sales Offices in Principal Cities

PIPELINE CONSTRUCTION

Project: 407-mile 12-in. line from Camiri to Sica Sica.
Status: Planned.

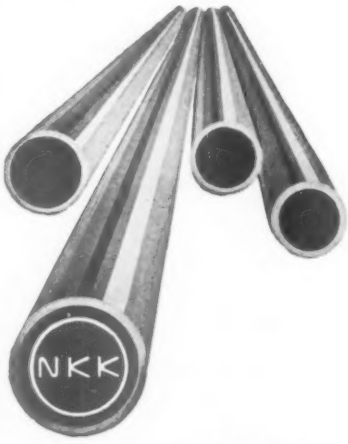
Foreign Products Pipelines

- **Egypt.**
Projects: 70 miles from Suez to Cairo and 14 miles from Alexandria to Kafr-el Dawar to carry kerosine, and 68 miles from Alexandria to Tanta to carry fuel oil. Construction of the lines was reported by a West German steel and pipe-manufacturers combine. Pipe order to Phoenix-Rheinrohr-International G.m.b.H. and Mannesmann-Export G.m.b.H., totaled $15 million.
- **Esso Petroleum.**
Project: 90-mile 10-in. line from the 244,400-bbl. Fawley refinery to London.
Status: Under way.
- **Estrada Ferroviaria Santos a Jundiai,** Sao Paulo, Brazil.
Project: 25 miles of 6-in. ethylene line from Cubatao to Rio Grande.
Status: Pending approval.
Contractor: **Techint, Inc.,** Milan, Italy.
- **National Iranian Oil Co.,** Teheran.
Project: 510 miles of 8-in. eastward from Teheran to Meshed, Iran.
Status: Under way.
Contractor: **Williams Brothers,** Tulsa, has contract for about half this project.
- **North Atlantic Treaty Organization** (Bid details from Bureau of Foreign Commerce, U. S. Department of Commerce, Washington).
Project: 57 miles of 8-in. in Germany to Land Baden-Wuerttemberg air field.
Status: Planned.
Project: 93 miles of 6-in. in Turkey.
Status: Bids requested in June 1959.
- **Petroleos Mexicanos.**
Project: 213 miles of 10-in. from Monterrey to Torreon.
Status: Under way.
Contractor: **Inde-Protexa.**
Completion: March 1960.
Project: 291 miles of 8-in. from Torreon to Chihuahua.
Status: Planned.
Completion: March 1961.
- **Pipelines of Puerto Rico,** San Juan.
Project: 95 mile 8-in. line from Commonwealth Oil refinery at Penuelas to Catano in the vicinity of San Juan.
Status: Approved by Puerto Rican Public Service Commission.
- **Syrian Pipeline.**
Project: About 310 miles from a new refinery at Homs to tank farms in the Damascus, Aleppo, and Latakia areas.
Status: Deadline for bids is February 29, 1960.
- **Union of Soviet Socialist Republic.**
Project: 2,315 miles of 28-in. Trans-Siberian crude-products line from Ufa Tuimaza fields in Bashkiria to Irkutsk near Lake Baikal.
Status: Under way.
- **Yacimientos Petroliferos Fiscales (Argentina),** Buenos Aires.
Project: 652 miles of 10-in. from Lujan de Cuyo to Buenos Aires.
Status: Planned.

Foreign Natural Gas Pipelines

- **Attock Oil Co., Ltd.,** London.
Project: 35 miles of 6-in. from Fenchu Hanj to Wah, Pakistan. Spread office is in Rawalpindi.
Contractor: **Contracting & Trading Co.,** Beirut, Lebanon.

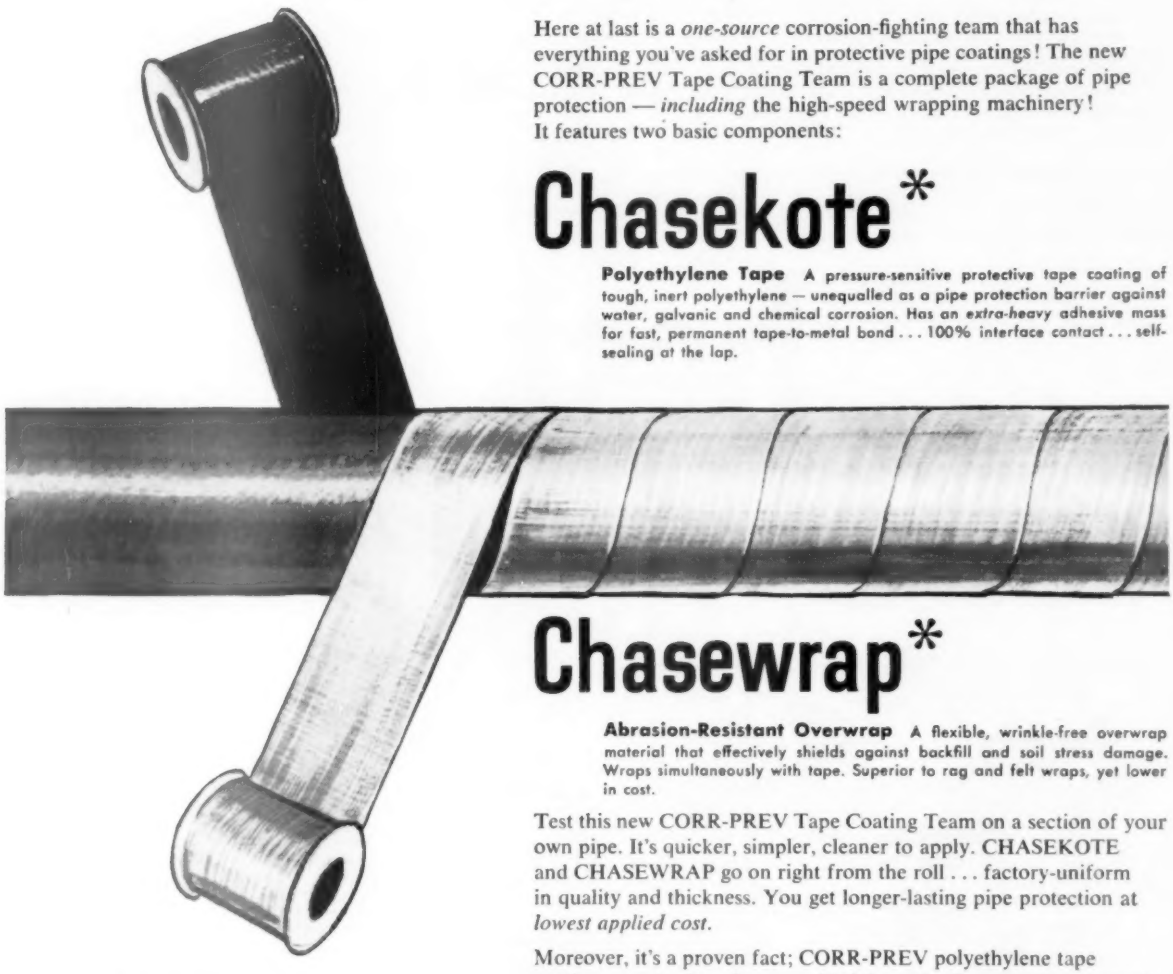
Pipe & Tube
For Oil and Gas Industries



Foremost Producer of Steel Pipe & Tube of All Types

NIPPON KOKAN K.K.
(Japan Steel & Tube Corporation)
Head Office:
Ohtemachi, Chiyoda-ku, Tokyo
Cables: STEELTUBE TOKYO
KOKANSHIP TOKYO
New York Office:
Room No. 1115, 39 Broadway,
New York 6, N.Y., U.S.A.

TRY THE NEW CORR-PREV TAPE COATING TEAM ON A TEST SECTION OF PIPE . . .



Here at last is a *one-source* corrosion-fighting team that has everything you've asked for in protective pipe coatings! The new CORR-PREV Tape Coating Team is a complete package of pipe protection — *including* the high-speed wrapping machinery! It features two basic components:

Chasekote*

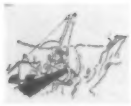
Polyethylene Tape A pressure-sensitive protective tape coating of tough, inert polyethylene — unequalled as a pipe protection barrier against water, galvanic and chemical corrosion. Has an *extra-heavy* adhesive mass for fast, permanent tape-to-metal bond . . . 100% interface contact . . . self-sealing at the lap.

Chasewrap*

Abrasion-Resistant Overwrap A flexible, wrinkle-free overwrap material that effectively shields against backfill and soil stress damage. Wraps simultaneously with tape. Superior to rag and felt wraps, yet lower in cost.

Test this new CORR-PREV Tape Coating Team on a section of your own pipe. It's quicker, simpler, cleaner to apply. CHASEKOTE and CHASEWRAP go on right from the roll . . . factory-uniform in quality and thickness. You get longer-lasting pipe protection at *lowest applied cost.*

Moreover, it's a proven fact; CORR-PREV polyethylene tape coatings require *less than one-third* the cathodic protection current demand of conventional hot coats!



Oil & Gas Transmission Lines

Public Building Lines

FREE! Sample Rolls of CHASEKOTE and CHASEWRAP

*Trade name of Chase & Sons, Inc., long-famous for protective and insulating tapes for electrical wire and cable.

Refineries & Gathering Systems

CORR-PREV DIVISION

Highway and Airport Conduit & Pipe

Chemical & Industrial Plant Piping

Utility Distribution Systems

MAIL COUPON TODAY!

Chase & Sons, Inc., CORR-PREV Division
26 Spruce Street, North Quincy, Mass.

Gentlemen:

Please send me FREE sample rolls and complete information about your new CORR-PREV Tape Coating Team — CHASEKOTE and CHASEWRAP.

Name.....

Title.....

Company.....

Address.....

City..... *State*.....

PIPELINE CONSTRUCTION

Completion: February 1960

● **Creole Petroleum Corp.**, Caracas, Venezuela

Project: 17 miles of 30-in. and about 2 miles of 18, 20, and 24-in. from Lake Maracaibo flow stations to conservation plant Muchapuerto 1.

Status: Planned

Completion: September 1960

Project: 34 miles of 12-in. from conservation plant Muchapuerto 1 at Lake Maracaibo to conservation plant Tia Juana 3.

Status: Planned

Completion: June 1960

● **Shell Venezuela (M) Co.**, Caracas, Venezuela

Project: 19 miles of 12-in. from East Soto to Tapatapa.

Completion: 1960

● **Pakistan Petroleum Co.**

Project: 145 miles of 8-in. high-pressure line from Sylhet field to Hazeq, East Pakistan.

Status: Proposed

● **Petroleos Mexicanos.**

Project: 381 miles of 24-in. from Ixhuatlan field in State of Tabasco to Mexico City.

Status: Under way.

Contractors: **Condumex** is contractor for contracts for eight river crossings on the project were awarded to **Collins Construction Co.**, Fort Lavaca, Tex., and **Constructora Indo S. A. de C. V.**, Mexico City.

Completion: December 1960

Project: 390 miles of 14-in. from Mexico City to Salamanca.

Status: Planned

Completion: September 1961

Project: 391 miles of 12-in. from Torreon to Chihuahua.

Status: Planned

Completion: March 1961

Project: 313 miles of 16-in. from Monterrey to Torreon.

Status: Under way

Contractor: **Isaac Pereyra.**

Completion: March 1960

● **OCP Nepal.**

Project: 137 miles of 24-in. from Hassi R'Mel gas field in Algeria to the Mediterranean Coast.

Status: Planned

Contractor: **Groupement Entreprises Stein Packhoens pour l'Industrie Electrique (GEEPI)** has contract for 391 miles from Hassi R'Mel to Tiaret.

● **Standard Vacuum Oil Co.**, New York.

Project: 60 miles of 8-in. from Radja field to proposed ammonia plant near Pangkalan, Sumatra.

Status: Planned

Completion: Ammonia plant is scheduled for completion in 1961.

● **Union of Soviet Socialist Republic.**

Project: A 362-mile line from Karadag near Baku to Chilial and Erevan.

Status: Under way.

Completion: 1960.

Project: A 137-mile line across the Turkmenian Desert from Bekdash to the Caspian Sea port of Krasnovodsk.

Status: Under way.

Project: Two parallel lines, each over 1,000 miles long, from Gazly, near Bukhara, northward to Sverdlovsk and Chelyabinsk.

Status: Proposed.

Project: Line from Samarkand, through Tashkent to Chimkent, Uchambul, Frunze, and Alma Ata near the border.

Completion: Line from Samarkand to Tashkent expected to be finished in 1960. Completion of rest of line expected in 1961.

Project: Line from Sverdlovsk to Ufa, Kuibyshev and Tuimb.

Status: Proposed.

Project: Line from Berezovo field to Sverdlovsk.

Status: Proposed.

Project: Line from Stalingrad to Gorky and to Moscow.

Status: Proposed.

Project: Line from Uchaksi field to Ishevsk and to Sverdlovsk.

Status: Proposed.

Project: Line from Gorky to Kuibyshev.

Status: Under way.

Project: Line from Saratov to Sverdlovsk, with branches into Stepanovskoe field.

Status: Proposed.

Project: Line from Kuibyshev (Kuibyshev-Ufa) field to Sukhumi.

Status: Proposed.

Project: Line from Shebelinka field to Rostov, to Odessa, and northward to connect with proposed line from Ufa to Leningrad.

Status: Under way.

Project: Line from Riga to proposed line from Ufa to Leningrad.

Status: Proposed.

Project: Line from Rostov to Moscow.

Status: Proposed.

● **Venezuelan Atlantic Transmission Corp.**, Caracas.

Project: 30 miles of 18-in. loop from La Vaguera to Tucupita Junction.

Contractor: **William Brothers Co.**, Tulsa.

Completion: March 30, 1960.

● **Yacimientos Petroliferos Fiscales (Argentina)**, Buenos Aires.

Project: Line from Comodoro Rivadavia to Buenos Aires with a spur to Plaza Huincul field in Neuquen province. Line will be 30-in. to the connecting point for the Plaza Huincul link and 20-in. from the connection to Buenos Aires.

Get the best deal ...in Oil Banking!

One of the largest Oil-credit files in the nation and one of the oldest, most experienced Oil banking departments in the world ... just

Think... 1st of Tulsa since 1888

FIRST NATIONAL BANK AND TRUST COMPANY

MEMBER FEDERAL RESERVE SYSTEM MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

ALLIED CHEMICAL'S* HOTLINE ENAMEL SOLVES HOT-SIDE PROBLEMS

Allied Chemical's Hotline Enamel takes high temperature punishment from the hot-side of compressor stations . . . for years! Allied Chemical's Hotline Enamel won't crack at −10°F.—as proved in laboratory tests and on-the-job performance for leading public utility companies.

Allied Chemical's *Job-Matched* Hotline Enamel is derived from coal-tar pitch, thus possessing inherent protective properties against the damaging effects of water, soil chemicals and electrical currents. In addition to these properties, Hotline Enamel is bargain rated both for initial cost and long-run service.

Provides improved protection under all these specific conditions:

1. Hot gas pipelines, on discharge side of compressor stations where line temperature is above 120°F.
2. On pipe-type cables or "oil-o-static lines" which are subject to internal elec trical heat from high-voltage surges.
3. Warm, swampy areas or other places where excessive soil stress on pipelines is encountered.
4. Areas where backfill and trenches are rough, rocky or contain foreign objects which normally penetrate softer coatings.
5. Pipelines (such as heated fuel lines) where temperatures are consistently high most of the time. but do not exceed 180°F. or for short-term exposure, 200°F.

*Though we've changed the name from Barrett Protective Coatings to Allied Chemical, you receive the same famous protection—pipeline coatings proved and improved for three generations.

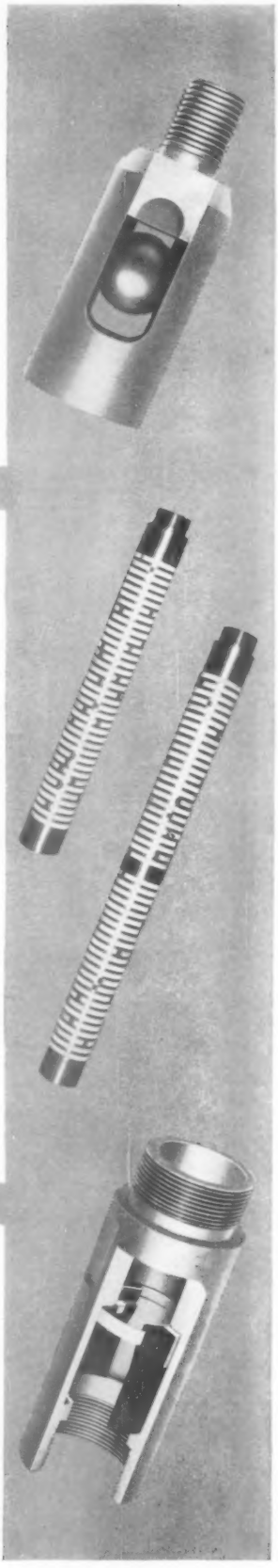
PLASTICS AND COAL CHEMICALS DIVISION
40 Rector Street, New York 6, N. Y.

Allied Chemical

Let Rubber Take The Wear

in your sucker rod pumps

It Costs You Less That Way



Both **MARTIN PLUNGERS** and **MARTIN RUBBER GUIDE CAGES** are the result of correct engineering to fully utilize the excellent properties of rubber.

In the **MARTIN SPLIT RINGS**, even the swelling of natural rubber in oil is utilized in sealing the split and tightening the rings in the PLUNGER GROOVES. **Resistance to abrasion** greatly prolongs plunger life in sandy conditions. **Slippery when wet** means that you have lubrication, even when pumping all water. Barrel life is increased because this material cannot score or gall metal.

For the **REPLACEABLE RUBBER GUIDES** in cages, **oil resistant** synthetic rubber is used. No swelling can be tolerated here. **Resilience** completely eliminates the beating action of the ball, and greatly increases ball life. **Resistance to abrasion** reduces wear on both guide and ball.

CUT YOUR COSTS . . . LET RUBBER TAKE THE WEAR . . . Write for our new 1960 catalog.

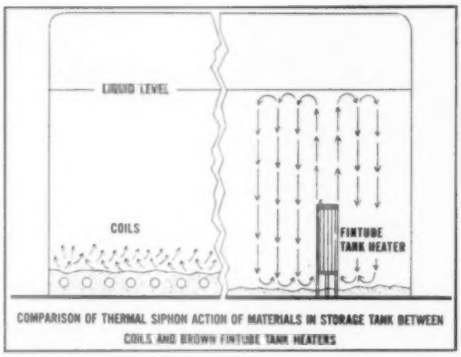
JOHN N. MARTIN

Manufacturer

9 W. BRADY STREET • TULSA, OKLAHOMA

▶ ▶ ▶ New Equipment Section

This week's SHOWCASE features . . .



COMPARISON OF THERMAL SIPHON ACTION OF MATERIALS IN STORAGE TANK BETWEEN COILS AND BROWN FINTUBE TANK HEATERS

Storage-tank heating

. . . is offered by this latest tank heater, the Model TFS-8, a finned type of heater. It is designed to help overcome the corrosion problems confronting plants that must use poor-quality steam.

The finned tubes, compared to other types, are said to reduce skin temperatures, thus reducing coking and/or product discoloration, and the vertical design sets up a thermal siphon action that prevents stratification or sedimentation in storage tanks.

Specifications include: (1) fin tubes of 1½-in. IPS Schedule 80 seamless pipe, (2) fins of 0.035 steel, 1 in. high, 36 per tube, integrally welded to the tube, (3) 295 sq. ft. of heating surface, (4) weight of about 450 lb., and (5) pressure rating of 600 psi. at 650° F. Price: about $315. Delivery time: 3 weeks. Source: **Brown Fintube Co., 518 Huron Street, Elyria, Ohio.**

Tachograph records

. . . on roll chart providing a convenient method for obtaining and presenting trip information. Liberal space is provided for each hour of operation, making is easy to obtain speed, mileage, and idling, stopping, and traveling time. This operating information can be readily correlated with the time of day.

Too, a portion of a trip chart can be cut off and the balance of the chart used for further recordings. The chart carrier is geared to a clock which moves the chart across the recording mechanism of the tachograph.

The new tachograph models include units that record miles per hour and engine revolutions per minute—Models EM and ER. The clock mechanism is horizontally mounted, and an arrangement has been made for setting the signal light easily and ac-

Barrel handling

. . . made easier with an attachment now on the market for fork-lift trucks. The fork-truck attachment has four self-contained 10-in. Vac-U-Lift pads mounted directly to a frame. The frame slips easily onto the forks of the truck. The pads adjust from 19 to 29 in. the long way of the fork and from 20 to 28 in. between the forks. Lifting capacity of each pad is 500 lb., giving a total lifting capacity of 2,000 lb.

A gasoline engine drives the vacuum pump. The pump has its own reserve vacuum system to provide safety in the event of an engine failure.

The pads can be used individually or in combination through manual control valves mounted for convenient selection. One to four barrels can be handled without a pallet. Delivery time: 30 days. Price: about $1,595. Source: **Vac-U-Lift Co., Div. of Siegler Corp., Salem, Ill.**

Want more facts about equipment or copies of product literature described in this issue?

Send this **Showcase Coupon**

to manufacturer at address shown in bold type after each item.

Product name, Model no., literature title or number: .....

.....

Described in OIL AND GAS JOURNAL - Issue of January 25, 1960

NAME..... TITLE.....

COMPANY.....

ADDRESS.....

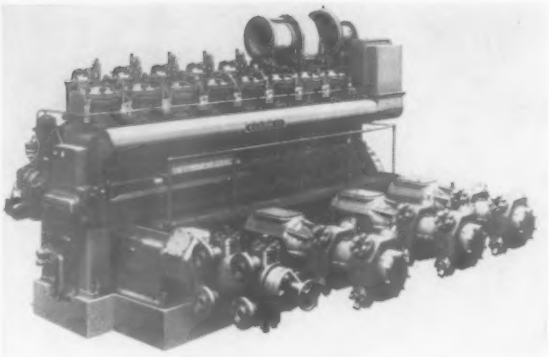
CITY..... STATE.....

curately. Details on the new models are given in new Bulletin SU-140. Source: **Wagner Electric Corp., 6400 Plymouth Avenue, St. Louis 33.**

•

Flow rates measured

. . . at 5,000 psi. and 100° F. with a variable-area type of flowmeter for low flows developed recently. The Series 6000 meter has a number of noteworthy features: (1) fixed low-pressure loss over the entire range of flow, (2) easily changed capacity—simply change float weight, (3) corrosionproof construction that permits handling of most acids, alkalies, and other corrosive fluids, and (4) a "quickout" flow tube that makes maintenance and replacement easy. Delivery time: 4-6 weeks. List price: from $170 for a 1,500 psi. steel unit, size 250, with vertical connections, up to $495 for a 5,000-psi. stainless-steel unit, size 500, with horizontal connections. Source: **C-Mar Corp., 35 Euclid Avenue, Manasquan, N. J.**



Gas engines can be turbocharged

. . . in the field with kits now available for most Clark RA and HRA gas-engine-driven compressors. Depending upon engine model, size, shaft diameter, and other design criteria, the conversion kits for field turbocharging make possible horsepower increases from 32-50% on the RA Series to 20-36% on the HRA engine series.

According to the maker, the conversion packages can substantially reduce fuel consumption per brake horsepower and increase horsepower output. This can usually be done without the need for more cooling service.

One big advantage is that horsepower can be increased without adding more operating personnel or enlarging present buildings. Each conversion kit contains: (1) a jet air-started turbocharger, (2) scavenging-air intercooler, (3) dry exhaust manifold, (4) control mechanisms, and (5) other parts required. In the RA Series, for example, such items as power pistons, rings, cylinders, heads, bearings, gas-injection valves, and valve gear must also be replaced with parts better

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PRESSURE GAUGE:

The First Accurate PRESSURE GAUGE! For Applications Requiring . . . RUGGEDNESS and DEPENDABILITY

Capacities:
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Write for Bulletin No. P-85
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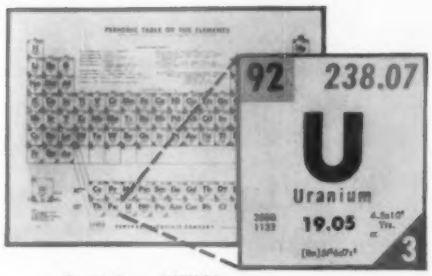

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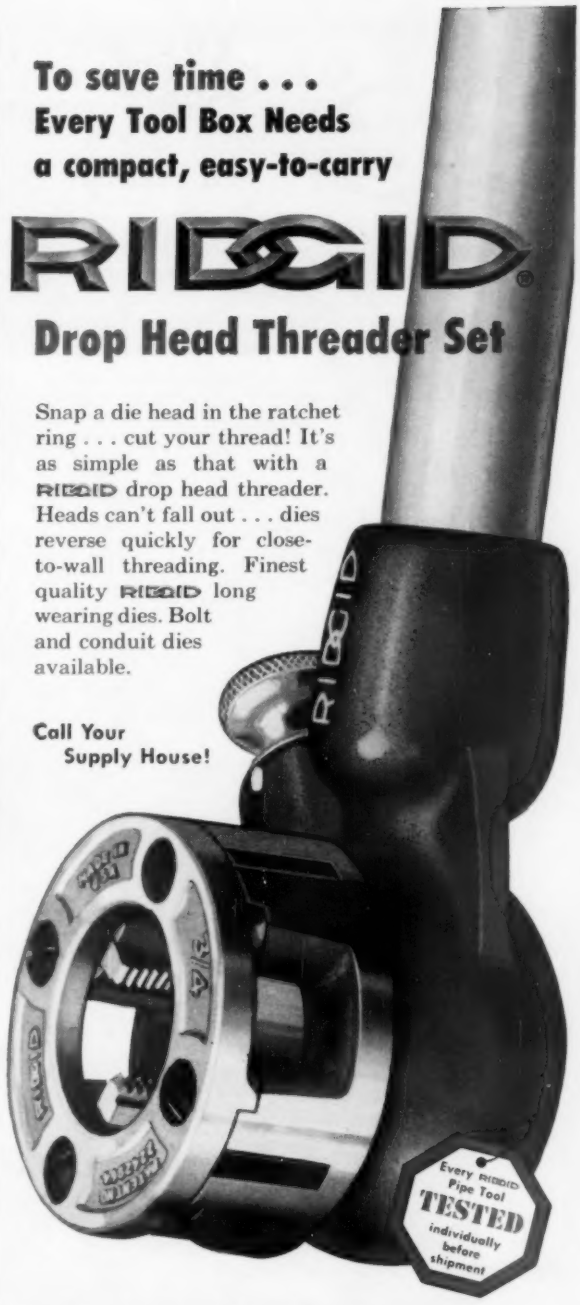

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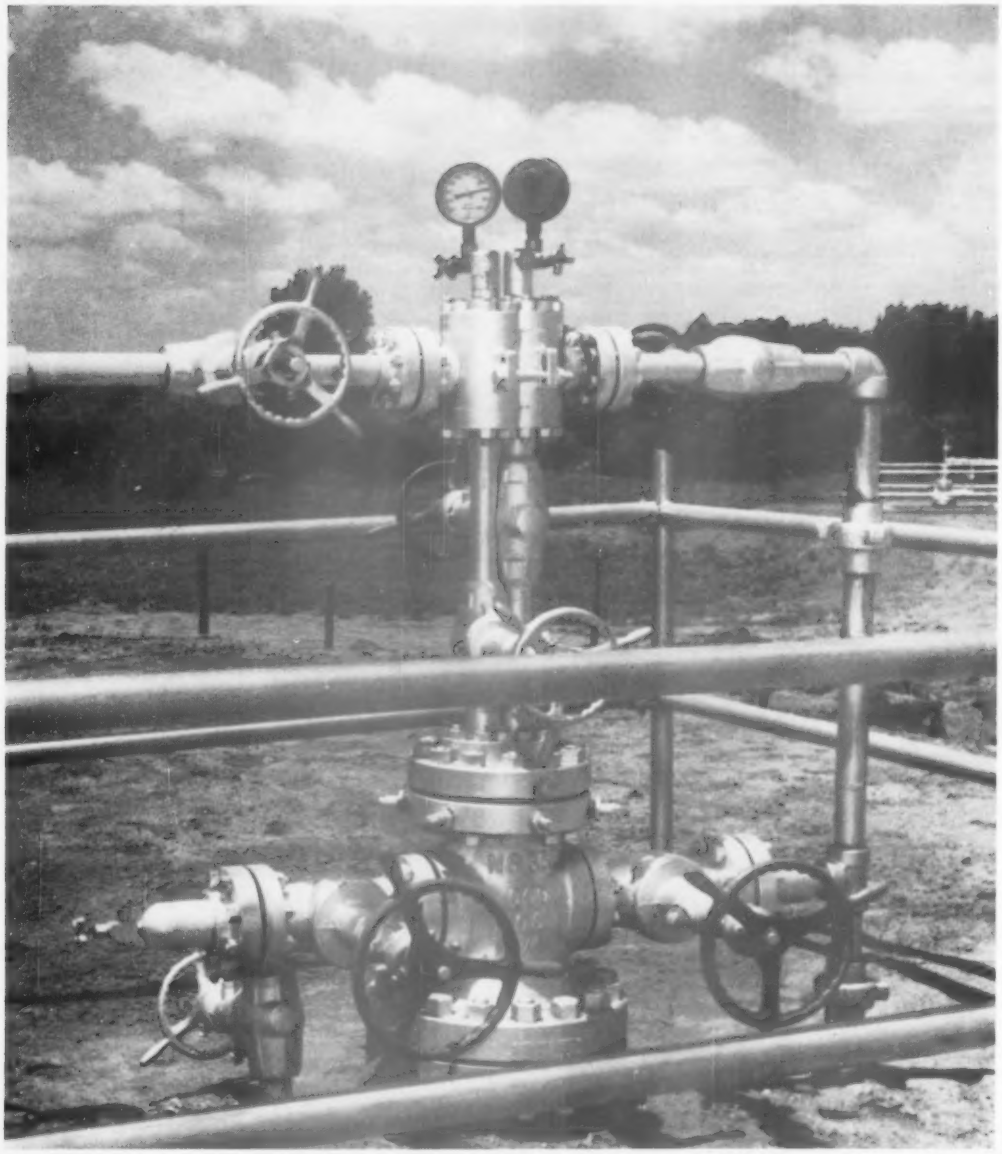
Orbit Valves are available also for Triple Hookups—working pressures up to 3000 lbs.



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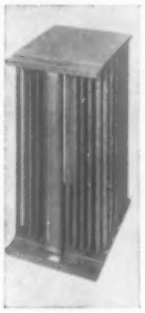
suited to handle the increased load which will result. In most engines, the scavenging cylinders are retained for good balance. Each conversion is handled as a separately engineered package tailored to the specific unit. Source: **Clark Bros. Co., Olean, N. Y.**

●

Modules



. . . for entrainment-separator made of impervious graphite for effective separation of entrained liquids from corrosive gas streams are now being produced. Designed for high collection efficiency and low pressure drop, the corrosion-resistant modules measure 1 by 2 ft. and can be easily assembled into banks to fit any duct or process vessel.

The Type MV units are of unitized construction and operate on the principle of impingement plus venturi action. Staggered rows of tear-drop-shaped Karbate impervious graphite rods are cemented in place with a minimum of ¼-in. clearance to minimize clogging.

The modules come in two styles. Style A is used in single-row entrainment separators or as the top row of larger assemblies. Style B units are for the lower rows and have a gutter and downcomer to provide positive drainage of the liquid separated from the gas by upper units. Approximate capacity of one module is the same as that of a 20-in. line type of entrainment separator. Delivery time: from immediate delivery to 6 weeks, depending upon number. Approximate net price, f.o.b. factory, ranges from $450 for Style A modules to $490 for Style B modules. Source: **National Carbon Co., 535 Fifth Avenue, New York 17.**

●

Sand pump

. . . to aid drilling, called the Glutton sand pump, is expected to prove useful to drillers in two ways: (1) as a drilling tool in breaking through and drilling cast-iron bridging plugs production packers, cement retainers, and other tough materials; and (2) as a sand pump to penetrate quickly to remove

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- ☐ HYDRAULIC FLUID MANUAL
- ☐ GENERAL CATALOG

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- Widest possible range of sizes and capacities.
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fracture sand, river sand, and similar foreign materials.

For drilling cast iron and hard material, a chisel shoe is used. The bit is made of alloy steel heat treated to a 290 Brinell hardness. As a sand pump, the tool is used with a specially designed flat-bottom shoe. A special flapper valve permits passage and retention of finely pulverized sands.

An advantage cited for the pump is that no expensive surface equipment is needed. Any conventional well-servicing rig is suitable. Source: **Production-Refining Equipment Co., 1306 West Second Street, Odessa, Tex.**

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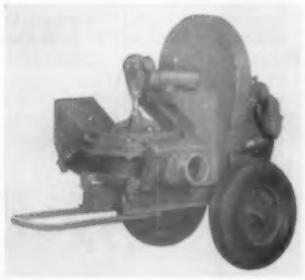


Water

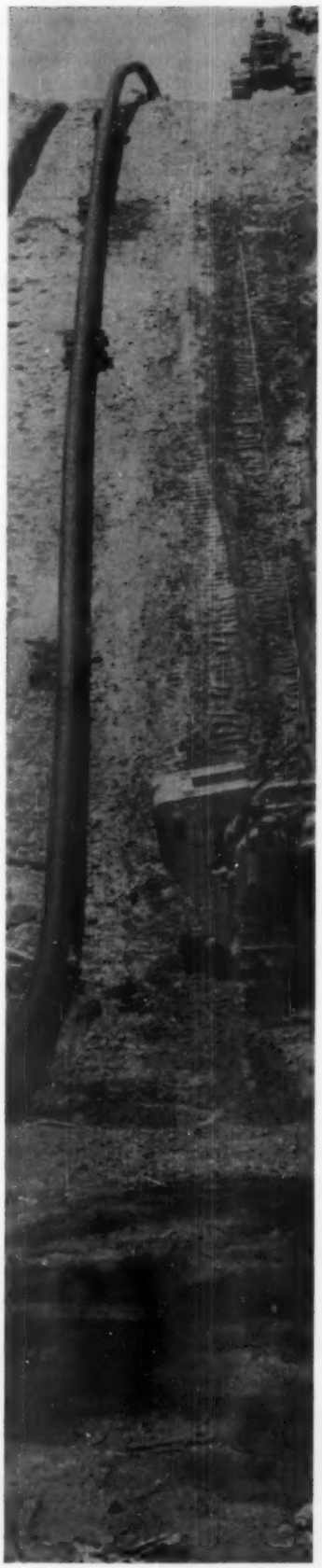
. . . containing solids is pumped with this diaphragm type of pump just announced. Compactly built and mounted on wheels, the pump is easy to operate in cramped space. It comes in four sizes from 1½ through 4 in. Power can be by gasoline engine, electric motor, or user's own available power.

The pump promises to be handy for pumping liquids with high solids content from tanks, excavations, and similar places. It is available from stock. Approximate prices for gasoline - engine - driven units on wheels range from $300 for the Model 15 DP rated at 3,000 gal. per hour to $591 for the Model 40 DP rated at 8,000 gal. per hour. Source: **Hale Fire Pump Co., Spring Mill Avenue, Conshohocken, Pa.**

●

Sonic energy

. . . used to fracture a producing formation at a predetermined depth and plane by a new expendable wire-line tool. The tool, called Stereo-Frac, used in the process contains a set of multiple jet perforating charges so directed and timed that shock waves resulting from the charges act together to produce a fracture in the formation. After the pay is fractured, the fracture is extended at normal injection pressures.



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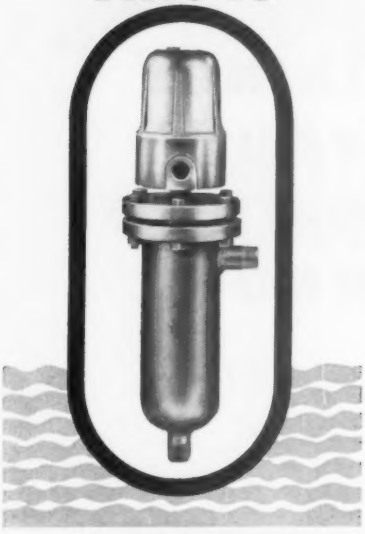

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Two advantages cited for the method are that: (1) the well bore is not subjected to high breakdown pressures which might approach the burst point of the pipe, and (2) the fracture can be spotted at a predetermined depth and plane.

The tool can be run with any wireline service company's cable head in all sizes of casing or open hole of 3¼ in. i.d. or larger. It can be run along with logging instruments or casing-collar-locator tools. Source: **Oil Tool Engineering Corp., Meadows Building, Dallas.**

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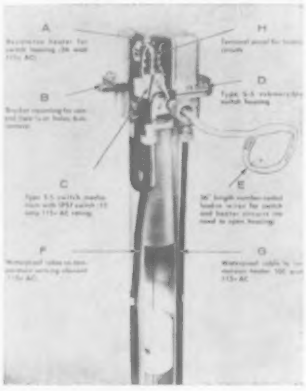

Level control works

. . . when installed on outdoor water-storage tanks, though ice forms in the tank. The Model A-101 liquid-level control installs in outdoor water-storage tanks by a bracket. Its switch housing is submersible and unaffected by humid atmospheres or by complete immersion of the head, according to the maker.

Inside the control, the mercury-switch assembly is protected against freezing in two ways: (1) by vapor-proof construction which prevents entrance of atmospheric moisture, and (2) by a resistance heater which keeps the housing interior warm.

If water temperature drops to 35° F. in the aluminum tube around the displacers, a thermoswitch cuts in to supply current to the immersion heater in the tube. In this way, ice can form on the surface of the water in the tank. But the water inside the aluminum tube is kept free from freezing and, by radiation, so is a sufficient area around the tube so that the displacers always monitor the true tank water level.

The displacers are set to keep a constant 36-in. differential. Delivery time: 3-4 weeks. List price: about $190. Source: **Magnetrol, Inc., 2110 South Marshall Boulevard, Chicago 23.**

75hp for boating's toughest jobs

The Evinrude **Starflite II**! Mighty power for a wide range of waterfront duties and commercial boating jobs. Smooth, quiet, tireless performer. Its V-4, 89 cu. in. engine develops 75 hp at 4500 rpm. You get outboarding's finest features: electric starting, automatic choke, sea-going magneto ignition, rugged Jetstream Drive, two-way shock absorbers. **Lowest cost per hp in history!**

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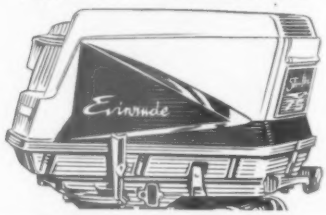

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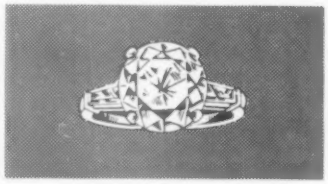

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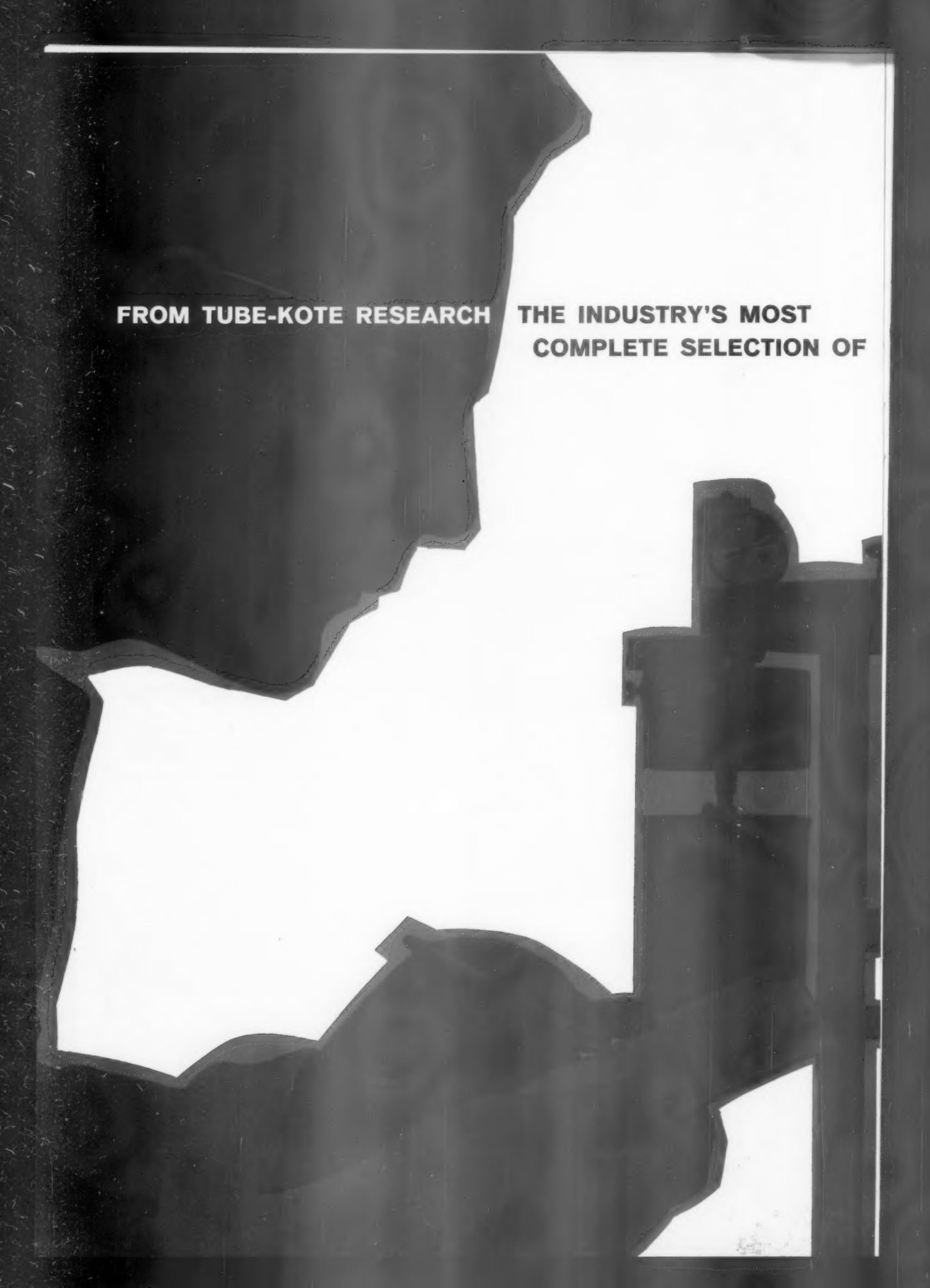
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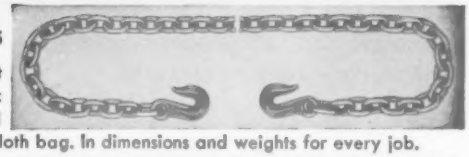
2 BY GRADE
The grade mark (see below) is on every other link . . . your permanent grade identification.

3 BY 5-FOOT INTERVALS
Campbell "Measure-Mark" . . . color-coded every five feet for quick, exact measurement . . . saves time.

The grade mark is a "P" for Proof Coil, "B" for BBB, "H" for High Test and an "A" for Cam-Alloy. The Campbell "C" appears on alternate links. Remember, the grade and make—your two most important safety gauges—are now permanently recorded where you need them most . . . right on the chain itself!

BOOMER CHAINS

Made from Cam-Alloy or High Test Steel Chain with Grab Hook each end, 20 feet long. Supplied bright finish. Packed one chain in cloth bag. In dimensions and weights for every job.



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Made from High Test Steel Chain, heat-treated for increased resistance to wear and shock loads. Tagged for size and length. Bright finish. In dimensions and weights for every job.

TRUCK TIRE CHAINS

Available in 3 grades: *Lug-Reinforced* for maximum traction and wear, *Mud-Service* for off-the-road use, *Highway Service* for general use . . . single pneumatic and dual triple.

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SHOWCASE . . .

New Equipment

Switch

. . . actuated by fluid flow is now on the market. It is a vane-operated but magnetically actuated flow switch that is completely sealed from the piped fluid. Responding only to product flow, the Flotect Magnetic Monitor can be used to protect pumps against loss of line flow, for automatic starting of auxiliary pumps, for signaling flow or no-flow conditions and locations, and for numerous other uses.

Mounting into the line, it is adapted to all sizes of pipes and has a 2,000-psi. working pressure. The vane responds to as little as 0.5 oz. of force. The maker's standard switch has a single-pole double-throw contact arrangement with a rating of 5 amp., 125-250 volt a.c. It can be adapted to 440 volt a.c. Delivery time: immediate for standard switch. Price: from about $140 for standard switch to $205 for a switch of special materials. Source: **W. E. Anderson, Inc., 2921 Brooklyn Avenue, Kansas City, Mo.**

●

New saddle

. . . with full encirclement can be installed without a bottom weld. Thus no bell hole is needed to install the Fleet-Line Part Five saddle. The saddle can be installed on buried lines with ascending vertical laterals after only enough excavation to permit the bottom half of the saddle to be slipped around and under the main line.

All welding is from the top and sides. Available in pipe sizes from 2 to 36 in., the saddle is priced the same as full-encirclement saddles split 180° from the nozzle. Delivery: immediate. Source: **Steel Forgings, Inc., Box 276, Shreveport, La.**

20,000 gallons of acetic acid ride in one aluminum package!

One of 50 GATX 20,000 gallon aluminum tank cars for glacial acetic acid service, delivered to Celanese Chemical Company by General American.

NEW GATX TANK CARS HAUL TWICE AS MUCH ACETIC FOR CELANESE!

Celanese Chemical Company produces millions of gallons of acetic acid—needs aluminum tank cars to transport it. Such cars, in standard 10,000 gallon size, have been supplied for many years by General American. Today a newly designed GATX car makes it possible to haul double the old quantity in one car.

Savings in freight rates, larger cargo capacity, much lighter weight per gallon of capacity, and greater product versatility are among the new GATX car's advantages. In addition to acetic acid, the 20,000 gallon GATX aluminum car can carry nitrogen fertilizer solutions, formaldehyde, hydrogen peroxide, fatty acids, acrylonitrile, nylon salts and many others.

General American builds, leases and sells a wide variety of special purpose cars. Tell us about your requirements. If there is no car exactly suited to your needs, General American can design and build one.

GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South LaSalle St. • Chicago 3, Illinois • Offices in principal cities

GATX GENERAL AMERICAN TRADE MARK

You'll find it pays to plan with General American!

Truck converted to wrecker fast

. . . with a battery-powered hoist recently placed on the market. The hoist is not only quickly installed but also easily removed from the bed of a pickup truck, the maker says.

Weighing only 210 lb., the hoist allows good road stability while towing, the maker reports. It operates on the truck's 12-volt battery plus an auxiliary. The batteries are recharged during over-the-road operation.

A light pendant type of control lets the operator move about freely at the spot where work is being done. Lifting capacity is 4,500 lb. with a single sheave block. Delivery time: immediate to 10 days. Price: about $650. Source: **Auto Crane Co., Box 3536, Utica Square Station, Tulsa.**

PIPELINE SYSTEMS
OIL GAS WATER PRODUCTS
WHERE IN THE WORLD DO YOU NEED CONSTRUCTION?
WILLIAMS BROTHERS
ENGINEERS — CONSTRUCTORS
NBT BUILDING, TULSA, OKLAHOMA / CABLE: WILLBRO
NEW YORK / WASHINGTON / LOUISVILLE
MINNEAPOLIS / CARACAS / BOGOTA / LA PAZ / EDMONTON
CALGARY / LONDON / ANKARA / TEHRAN

Well flow increased

. . . by new vane. The well-flow straightening vane, the maker claims, corrects the turbulence of oil and gas before it enters the tubing. By eliminating the vortex at the bottom of tubing, caused by the swirling action of the formation fluid or gas as it enters the production pipe through perforations, production may be substantially increased, the maker says. The straightening vane can also improve the production from high gas-oil ratio wells, according to the maker.

The well-flow vane comes in two models for standard packers and insert-type packers. Both are provided with a 2⅜-in. API upset tubing thread for attaching to the bottom joint of tubing. Delivery: immediate. Price: about $85. Source: **Petroleum Instrument Co., Box 6252, Houston 6.**

Temperature

. . . closely controlled with a new indicating temperature controller now available. The Series 6000 indicating temperature controller features a 12-in. circular readout. Control is maintained electronically without depending upon the meter movement for control. The indicating pointer is easily seen by the operator at some distance.

The controller comes with either time-proportioning or on-off control, with or without anticipating section. Delivery time: 1 week. Price: about $235 to $265. Source: **Electronic Process Corp. of Calif., 436 Bryant Street, San Francisco.**

Solvent-welding makes joining Butyrate pipe a simple and rapid operation.

Oil field workers appreciate the ease with which pipe of Tenite Butyrate plastic can be handled.

Butyrate plastic pipe takes the abuse of oil field use

A pipe has to take some pretty rough handling in oil fields. And that's just what pipe of Tenite Butyrate plastic has been doing for nearly a decade.

Its horn-like toughness and high impact strength enable Butyrate pipe to take all normal backfilling operations. What's more, this pipe is semi-rigid. It gives with ground movement and facilitates direction and contour changes.

This lightweight pipe is tough

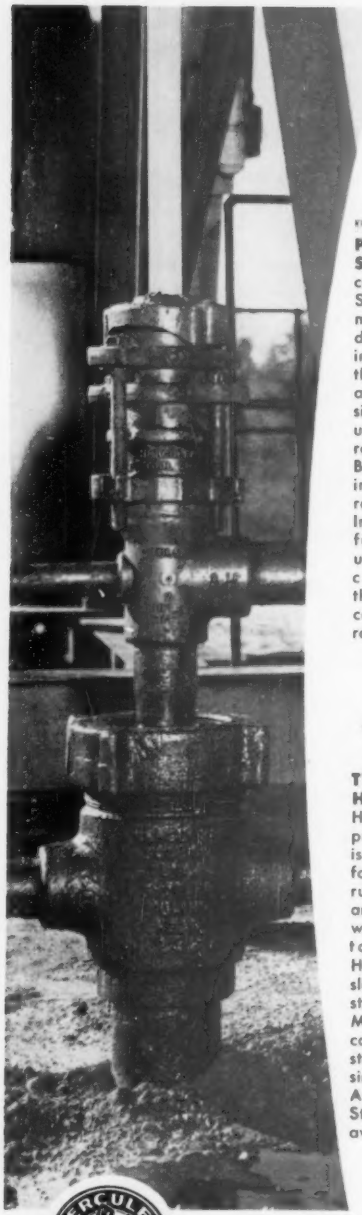
Once pipe of Tenite Butyrate is installed, you can forget it. Virtually non-corrodible, it keeps maintenance costs at a minimum. The smooth inner wall of this pipe works for you in two ways. It offers low frictional resistance, thereby giving greater flow volume than metal pipe for any given head loss, *and* it minimizes clogging by discouraging the accumulation of paraffin.

Millions of feet of Tenite Butyrate plastic pipe are now in use in the petroleum industry. Perhaps this pipe could cut costs in your operations. We will be happy to send you additional information about its properties and applications, plus the names of companies that produce the pipe and a complete range of fittings. Address: EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

A 16mm. sound-color film, "Plastic Pipelines," is available upon request.

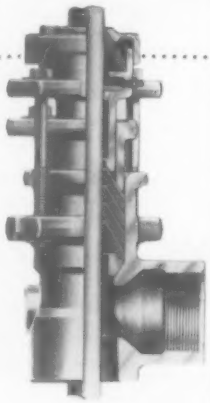
TENITE
BUTYRATE
an Eastman plastic

HERCULES products in ACTION

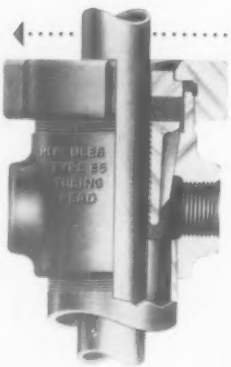


A typical set-up is shown below in Creek County, Oklahoma, using Hercules "Tee Type" Duplex Polished Rod Stuffing Box and Type "E5" Tubing Head. This is an easily assembled, effective and economical producing unit.

"TEE TYPE" DUPLEX POLISHED ROD STUFFING BOX—A combination Tee and Stuffing Box with female thread to screw directly onto the tubing, eliminating one threaded connection and resulting in a considerably shorter hookup. With internal parts removed, the Stuffing Box body is full opening and need not be removed to pull rods. In addition to being furnished in the most used sizes, special combinations of threads and outlets can be furnished on request.



TYPE "E5" TUBING HEAD—This Tubing Head is ideal for any pumping situation. It is economical enough for shallow wells and rugged enough for any depth well, with working pressure up to 1500 pounds. Hercules self-aligning slips suspend the inner string in this Head. Mandrel suspension can be furnished instead of slips, if desired, at no extra cost. A neoprene Tubing Stripper Unit is also available.



Write for complete information on any Hercules Product.

HERCULES TOOL COMPANY

MANUFACTURERS OF OILFIELD EQUIPMENT

GENERAL OFFICES AND PLANT • TULSA, OKLAHOMA

Export Representative Oil Field Equipment Co., Inc. 90 West Street, New York, N. Y.

Smooth load "inching" possible

. . . with an electric fork truck now available, according to the maker. The EC-25 truck has a 2,500-lb. capacity. A carbon-pile drive control is used to obtain smooth acceleration. Working through a hydraulic circuit, the carbon-pile control permits steady, stepless acceleration for "inching" operations where loads must be placed delicately.

Acceleration is provided by dual-field series windings in the drive motor. The contactor panel is located in the counterweight of the truck and protected by a steel cover. It is easy to get to for maintenance.

The fork truck has a 64-in. turning radius, 44-in. wheelbase, and 45⅜-in. seat height. Weight: 5,445 lb., including a 1,728-lb. lead-acid battery. Delivery time: from stock up to 90 days or more. Price: about $6,000, less battery and charger. Source: **Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.**

•

Lube-oil additives

. . . are specifically designed to prolong the life of high-compression automobile gasoline engines which operate much of the time at low temperatures, the maker says.

Called Series 500, the additives are balanced blends of dispersants and detergents which, the maker claims, have proved markedly effective in checking engine deposits during cold-engine operation.

The maker says they also give excellent results in high-temperature operation. Source: **Oronite Chemical Co., 200 Bush Street, San Francisco 20.**

•

Welding-cable

. . . connector won't overheat or arc, the maker says. And it joins securely with a twist of the wrist. An eccentric locking or wedging action provides an

E. Ralph Daniel, Petroleum Engineer (right), and William W. Cumberland, Landman, members of our Oil and Gas Department Staff.

The seasoned members of our Oil and Gas Department are interested in YOU. You and your business welfare are of prime importance to the officer who serves you. When *you* prosper our bank also prospers. It will be a pleasure to work with you.

Bank of the Southwest
NATIONAL ASSOCIATION, HOUSTON

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Wherever air drilling solves the problem ... Gardner-Denver has the answer

- Air drilling
- Aerated mud
- Muddiated air
- Mist drilling
- Gas drilling
- Restoring lost circulation

THERE'S NO SUBSTITUTE FOR MEN

100 years of customer confidence. Side by side with "roughnecks," the Gardner-Denver man finds himself out on lonely offshore barges or in oil fields scattered throughout the world—always keeping a careful eye on his equipment's performance.

A background of experience in developing compressors and devising techniques for every phase of air drilling provides Gardner-Denver specialists with a fund of knowledge that's at your service wherever compressed air may solve a drilling problem for you.

Alaska, Canada, United States, Mexico, Australia . . . Guatemala, Honduras, the Bahamas . . . Turkey, Libya, Algeria, Saudi Arabia. Wherever air drilling has been put to work, Gardner-Denver specialists have worked side by side with drilling crews.

In scorching desert temperatures of 135° . . . at 55° below in the Arctic . . . at sea level . . . or at altitudes of 10,000 feet, Gardner-Denver equipment has passed the toughest test of all—field experience.

Specify Gardner-Denver compressors with confidence for air drilling any size hole to any depth, with seismograph rigs or with the largest of land-based or offshore rigs.

Consult your Gardner-Denver air drilling specialist—or write for further information.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario
Gardner-Denver Export Division, 233 Broadway, New York 7, N. Y.
Oil Field Offices: Casper, Cleveland, Columbus, Corpus Christi, Dallas, Denver, Durango, Edmonton, Ellinwood, Evansville, Houston, Huntington, Jackson, Kansas City, Lafayette, Los Angeles, Mexico City, New Orleans, Odessa, Oklahoma City, Pittsburgh, San Francisco, Shreveport, St. Louis, Tulsa, Wichita, Winnipeg

efficient electrical contact to prevent overheating. Normal wear increases the contact area.

Constructed without moving parts, the connector has a molded neoprene cover to prevent short circuits and outside arcing. Too, the cover resists oil and grease damage. The individual male or female parts can be obtained separately. The connector is equipped with soft copper sleeves to permit cable attachment by either lead soldering or crimping. Two sizes are available: Model 120 for use with 1/0 and 2/0 cables and Model 340 for use with 3/0 and 4/0 cables. Delivery: immediate. Approximate list price, f.o.b. factory: $4.25. Source: **Ampco Metal, Inc., 1745 South Thirty-eighth Street, Milwaukee 46.**

●

Aluminum meters

. . . with large capacity for gas measurement now available come in nine models with capacities from 150 to 10,000 cu. ft. per hour. Model 3000 is rated at 3,000 cu. ft. per hour and 1,400 cu. ft. per hour at differentials respectively of 2 and ½-in. water. Model 10000 is rated at 10,000 cu. ft. per hour at 2-in. water and 4,700 at ½-in. water.

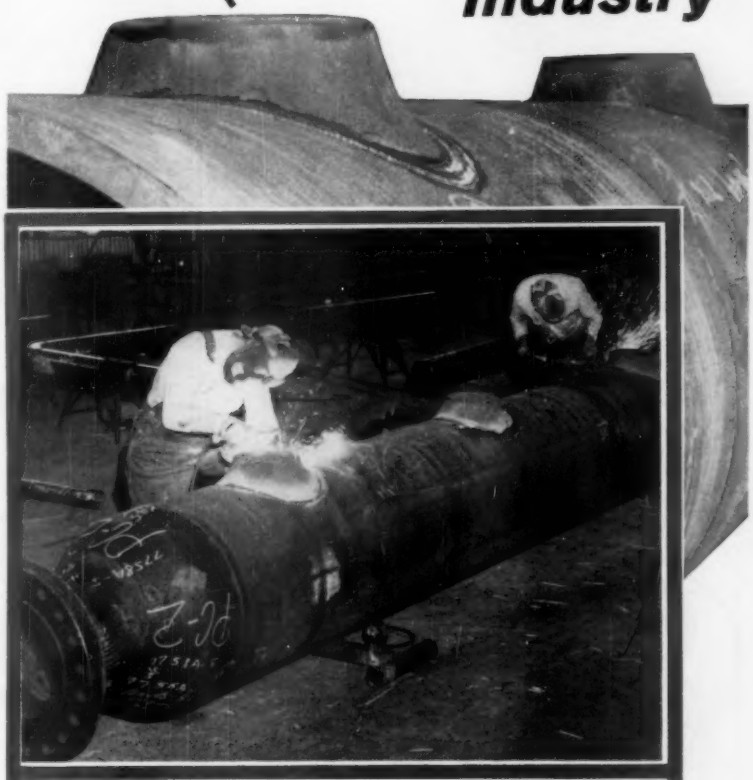
They are suited for commercial and industrial operations where large volumes of gas at high pressure are to be measured. The Model 10000 has a working pressure of 100 psi. and weighs 310 lb., about one-third the weight of a comparable cast-iron meter with the same capacity.

The Model 3000 has a working pressure of 100 psi. and weighs 100 lb.

One advantage of the aluminum meters over cast-iron meters is that they offer a way to reduce cost and labor in shipping, handling, and setting. Source: **Rockwell Mfg. Co., 400 North Lexington Avenue, Pittsburgh 8, Pa.**

BONNEY SWEEPOLETS Pat. Pend. ®

---are SWEEPING the pipeline industry



The Bonney Sweepolet is an integrally reinforced insert butt welding pipe fitting specially designed for stress free branch connections on high pressure pipelines.

WRITE FOR CATALOG S-1A

BONNEY FORGE and Tool Works

ALLENTOWN, PENNSYLVANIA

BONNEY

Warren's High Pressure Screw Pump is proving its true economy with pumping efficiencies of 75% to 85% – on either high or relatively low viscosities

Warren *8CB Screw Pumps handling crude oil at a primary pumping station.

In crude line, product line and refinery jobs Warren High Pressure Screw Pumps —

- develop continuous flow
- can be direct driven . . . speed reduction gears are not necessary
- maintain constant capacity and pressure, even on oil containing foreign matter
- are suitable for unattended stations.

WRITE FOR SELECTION NOMOGRAPH #252

CENTRIFUGAL SCREW RECIPROCATING GEAR

WARREN PUMPS, INC.

WARREN, MASSACHUSETTS

O-1

SHOWCASE . . .

New Literature

Electric motor

. . . operators for use with Jamesbury Double Seal ball valves in the ¼ to 4-in. size range are described in a product data sheet recently issued. According to the literature, operators are weather and vaporproof and can be manually operated in case of power failure. They have planetary gearing and a life expectancy in excess of 500,000 cycles.

The data sheet includes drawings and dimensions for two sizes of motor operators to fit valves in the specified size range. Also shown is a wiring diagram and a chart pointing out temperature characteristics. Source: **Jamesbury Corp., Dept. NR-1, 148 New Street, Worcester, Mass.**

Sodium-zeolite

. . . water-softening manual describes the process and gives information on selecting and sizing of equipment. Automatic versus manual controls and calculations of softening capacity are discussed. The more frequently used zeolite materials, both siliceous and nonsiliceous, are described.

Illustrations and cutaway drawings show typical treatment systems. Manual 4520 also explains the use of a new hydromatic single-control valve to operate zeolite softening units. Source: **Cochrane Corp., Seventeenth Street Below Allegheny Avenue, Philadelphia 32.**

Steam traps

. . . and condensate drainage are detailed in a free booklet now obtainable. The publication — entitled The B&J Steam-Trap Primer—gives fundamental facts on condensate drainage and on all types of steam traps. The primer is recommended as a review for maintenance engineers and foremen. Source: **Barnes & Jones, Inc., 34 Crafts Street, Newtonville 60, Mass.**

Well-drilling bulletin

. . . for water wells and shallow oil wells has just been made obtainable. Form 4209 describes the new highly mobile, over-the-highway Trucm-3 Drillmaster unit, designed to use the Ingersoll-Rand Downhole drill.

The literature describes procedures for water wells and shallow oil wells and gives typical cost-analysis comparisons for both types of jobs. Complete specifications on Downhole drill

HOKE Flow Sheet

HOKE REPORTS ON FLUID CONTROL

A VALVE NAMED "DESIRE"

With apologies to Tennessee Williams, we really have produced a Solenoid Valve line based on *your* desires. We surveyed all the solenoid valve users we could find to determine what *you* wanted. The result is Hoke's "User Designed" Series 90 and 95, two-way and three-way, direct-acting solenoid valve line.

Thanks to you, we have much to brag about. Here's what we have been saying about these new valves: lightest weight – smallest size – no-hum operation – lowest temperature rise – lowest power consumption – stainless steel plunger – silver AC shading coils – easiest installation – packless construction – 360° rotatable housing – operates in any position.

We make them of forged brass or stainless steel, in ⅛" and ¼" NPT size or JIC tube ends. There's a variety of AC and DC voltages. Class "A" coils are standard, but Class "H" are also available for temperatures above 212°F. For those with high insurance rates, we can supply explosion proof coil housings.

Now that we've bragged a bit, we must also apologize for our premature enthusiasm. We were so excited about this product that we stirred up a hornet's nest of interest before we were ready to deliver in quantity. Shipments were slow at the start, but now we can have any reasonable quantity of these "desirable" solenoid valves "on-stream" in your plant when you want them.

There's only one way to get conclusive performance proof – buy a valve. Ask for Bulletin SV-1159.

What Goes With What?

This is a question engineers and chemists are constantly asking each other. Not that we want to do away with this healthy interplay at the water cooler, but we have put together a slide rule that answers all these questions. It lists 22 metals and materials and their degree of resistance to 247 corrosive agents.

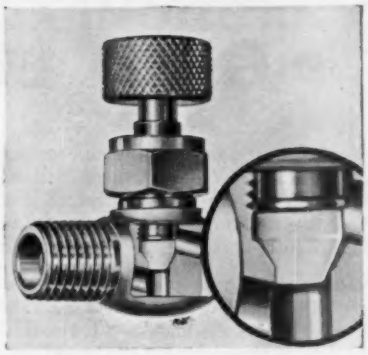
Got yours? Write now while there are a few (thousand) left.

HOKE'S NEW PLASTIC STEM TIPS END CHRONIC FAILURE PROBLEM

Galling and scoring valve seats plagued valve users and manufacturers for years, until somebody thought of using plastic stem points. This idea worked well at low pressures, but when the pressure increased – poof! – the valve blew its tip. Up to now, this problem had continued to bother valve makers.

Fortunately, a die-hard Hoke engineer insisted he could put a permanent plastic tip on a high pressure valve. We gave him his head and he gave us a plastic-tipped valve-stem (using either Kel-F or Nylon). His unique design incorporates a crimped metal shell that grabs the plastic tip and *really* holds!

Not satisfied with this monumental accomplishment, he proceeded to tackle leak problems at the stem packing. He put an O-ring seal on the stem and compressed it with a newly-designed Nylon collar. The collar serves a dual role, for it also prevents grit and other foreign matter from chewing up the O-ring. Valves of this new design have performed successfully up to 3500 psi. Our die-hard engineer not only

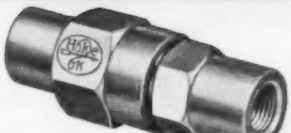


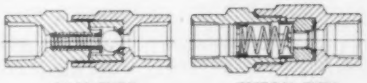
ended galling, but also seat leakage, stem leakage and wear problems – all at one swoop.

There's only one feature about this new development that worries us–since we do not expect replacements we may have designed ourselves right out of the valve business! We make these little dandies of either forged brass, bar stock or 316 Stainless, with ⅛" and ¼" male connections. Temperature limit is 400°F. For the complete story, write, wire, phone or we'll come see you.

Hoke "TECH-SPEC"

570 SERIES CHECK VALVES





BALL TYPE PISTON TYPE

Designed for gas or liquid service at pressures to 5000 psi. Ball and piston types for extremely effective leak-tight closure, coupled with minimum flow resistance. Ball types in ⅛" and ¼" sizes; piston types in ⅜" and ½" sizes. Temperature limits, –40 to 200°F. Body materials are Brass or 303SS. End construction is interchangeable with any combination of inlet and outlet connections. O-ring seals are available.

HOKE, INCORPORATED
63 Piermont Road, Cresskill, N. J.

Send me complete information on the Hoke products checked below:

- ☐ Plastic Stem Tips
- ☐ Solenoid Valves
- ☐ 570 Series Check Valves
- ☐ FREE Corrosion Slide Rule
- ☐ Have a salesman call

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

Special report to owners of Traxcavators, D6 and D4 Tractors

CAT CATERPILLAR

Parts you can trust
Dependable round-the-clock service

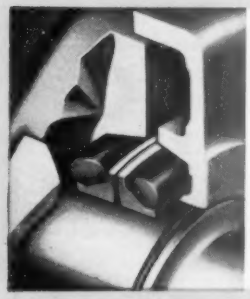
Now available...lifetime lubricated rollers...two-way savings...

ELIMINATE MAINTENANCE GIVE LONGER LIFE

Here's another cost-cutting improvement for Traxcavators and both D6 and D4 Tractors . . . lifetime lubricated rollers. Now you can eliminate on-the-job shutdowns for greasing. And you get longer life from rims, flanges, internal parts. The payoff . . . reduced replacement costs, savings in time.

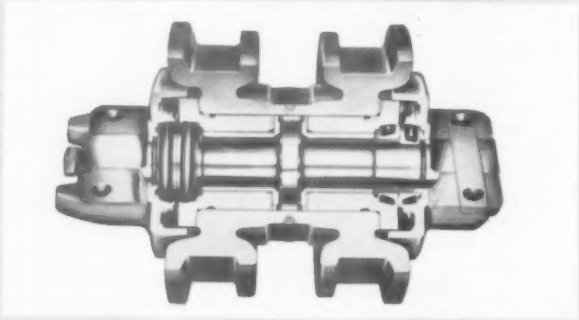
How maintenance is eliminated—the new Cat-built rollers are lubricated when first installed. They are equipped with floating ring seals that keep lubricant in . . . grit out . . . for the life of the rollers. Only when rollers are disassembled for rebuilding will relubrication be necessary. And the original metal rings can be reused.

New floating ring seal . . . only four parts, no springs. The roller seal employs two alloy metal rings and two rubber "O" rings. The metal rings, much harder than the best file steel, have lapped faces, smoother than glass. These faces taper slightly toward the inner edge forming a sealing area at the outer edge. As wear occurs, the sealing area moves gradually inward, maintaining a perfect seal for thousands of hours.



The "O" rings keep constant pressure on the metal rings. Lubricant can't get out. Grit can't get in. There are no springs or diaphragms to weaken, wear or become damaged. The "O" rings are made of special compound to resist oil, heat, cold.

Why do roller parts last longer? Grit is permanently sealed out. Big lubricant reservoirs (with strategically located oil passages) insure ample supply of lubricant to moving parts. Oil instead of grease is used for roller lubricant. Oil dissipates heat faster, circulates more freely than grease. These features assure you of longer shaft and bearing life. Longer bushings with extra-thick flange assures rigid support. Large sleeve bearings provide ample bearing area. Larger diameter, deep-hardened shafts withstand higher shock loads. Beam strength has been increased 63% for D6 shafts; 185% for D4 shafts. Resistance to side thrust is greatly increased in D4 shafts by a 25% wider center flange and 73% more thrust-bearing area.



Why do rims and flanges last longer? The new two-piece roller shell has greater strength and impact resistance. Special heat-treat process provides extra-hard and deep wear surfaces. Ample steel under tread gives strong support to resist shock loads. Thicker flanges combat peening over. Overlapping center joint maintains rigid shell without separate hub.

Easy installation is achieved by use of snap rings to hold the seals and end collars in place before mounting. End collar bolt holes will line up easily with track roller frame holes during installation.

Millions of hours of proof—the toughest track rollers yet. Cat lifetime lubricated rollers have been subjected to extensive and exhaustive on-the-job tests for over 5 years. Working on all types of job conditions, these time-tested rollers have proved to be unequaled. And machine-owner reports prove that Cat lifetime lubricated rollers can't be beaten for low-cost, minimum maintenance operation.

See your Caterpillar Dealer. He'll give you the full story on this time-saving, money-saving undercarriage component.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U.S.A.

SERVICE TIP: When rebuild time finally comes, be sure to keep the metal rings matched in original pairs, being careful not to nick or mar the lapped surfaces.

CATERPILLAR

Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

and the Trucm-3 are included as are all drilling accessories needed in well-drill work. Source: **Ingersoll-Rand Co., 11 Broadway, New York 4.**

Infrared analyzer

. . . is described in new Bulletin 0705-3 just issued. The 4-page literature highlights features of the Model 300 LIRA analyzer, including its small size and portability, rollout tray construction, and flexibility in handling a variety of gas-analysis problems.

Applications are outlined for furnace atmosphere and combustion control, humidity measurement, logging of gas and oil wells, petrochemical process-stream analysis, and detection of toxic and combustible gases.

In addition to a schematic diagram showing operational principles of the instrument, the bulletin also provides complete performance specifications. Source: **Mine Safety Appliances Co., 201 North Braddock Avenue, Pittsburgh 8.**

Inspection light

. . . and view ports which are heat-resistant, pressuretight, and dustproof, are described in a new bulletin recently introduced. The publication describes features which include the impermeability of both units to corrosive liquids or fumes; ease of changing bulbs from outside without interference to equipment operation; and conventional or vibrationproof lamp holder for inspection light bulb. Source: **R. H. Wager Co., Dept. 23, 423 Valley Street, South Orange, N. J.**

Magnetic solenoid

. . . valves used primarily for the control of water, oil, steam, air, solvents, gas, and chemicals are highlighted in a new catalog which contains several individual bulletins. Cross-sectional diagrams and photographs explain function and operation of the electrically controlled valves.

You may select the proper valve required and submit orders complete with price information from specifications which are included in chart form. Source: **Magnatrol Valve Co., 60 Fifth Avenue, Hawthorne, N. J.**

Hydrogen determination

. . . in liquids to within 1% relative in 1 minute using the Model 104 Nuclear Magnetic Resonance (NMR) analyzer is described in Material Study Report 29.58. Per cent hydrogen by weight in

from the makers of Dimetcote . . .

ZINKOTE

THE FIRST 100% INORGANIC *SELF-CURING* ZINC COATING . . .

- A radically new concept in zinc coatings for protecting steel.
- Under development for many years and first patented in 1957.
- Applied in one coat – completely self-curing.
- Can be used wherever galvanizing is satisfactory – actually gives superior protection.
- Completely nonflammable, nontoxic.
- Insoluble in all petroleum products.
- Outstanding resistance to weathering, salt and fresh water.
- Applied by brush, spray or roller.
- Cathodically protects steel.
- Resists temperatures up to 600°F.
- Complete protection for as little as 5¢ per square foot material cost.

How does Zinkote compare with Dimetcote?
Although similar, each has certain unique advantages depending upon the particular requirements of the job. We will be glad to give you a specific recommendation.

For complete information write . . .

Amercoat® CORPORATION

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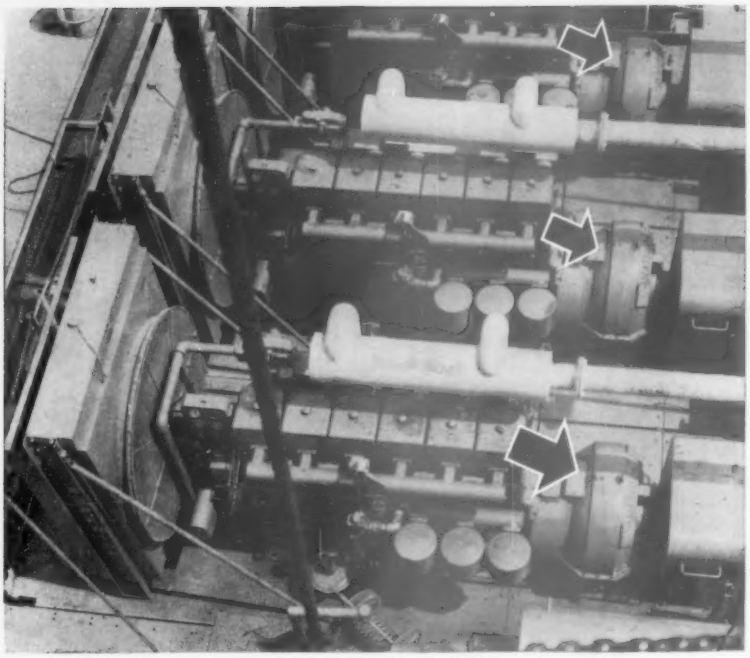
119A

The Pioneer Manufacturer of Inorganic Zinc Coatings.



Not one hour of lost time in 40,000 hours operation of these NATIONAL TORQUE CONVERTERS

Here's a report from a large California drilling company that explains why so many cost-conscious operators specify National Torque Converters on their rigs.

During 40,000 hours of operation, delivering maximum power continuously, on 14,000 to 16,000-foot wells, *not one hour of lost time could be attributed to the converters*. Furthermore, the manager of drilling operations said they had experienced improvements in rig performance and in reduced maintenance.

Rig maintenance has been much less than with direct mechanical drives, the manager reports, and converter performance cannot be equalled. Chain life has been exceptionally long, and no repairs were made on the rig clutches because shock loads were absorbed by the converters. Converter maintenance was minor, and easily handled by the rig crew or the driller's mechanic.

Tool pushers report that the National Torque Converters make the rig one of the fastest in the area. In these days when jobs are fewer, and bids are tighter, that is another big advantage to consider.

If you would like information on National Converters for your present rigs, or on any new rigs, just write . . .

THE NATIONAL SUPPLY COMPANY

Two Gateway Center, Pittsburgh 22, Pennsylvania

Subsidiary of Armco Steel Corporation

most liquids can be measured quickly and easily by the analyzer, according to the study.

Temperature variations of 10° C. have negligible effect. The report shows the accurate results obtained with n-heptane, gasoline, octane, cyclohexane, ethanol, distilled water, acetone, xylene, n,n-dimethylformamide, toluene, benzene, tetrachloroethane, and chloroform.

Steps in sample preparation and NMR testing are given, together with calibration curves. Source: **Ridgefield Instrumentation Div., Schlumberger Well Surveying Corp., Ridgefield, Conn.**

Process refractometer

. . . is a new instrument designed for measurement and control of liquid organic and inorganic streams. Bulletin 0714-4 provides details on application of the refractometer to a variety of industrial problems, including the control of either stream or batch processes, the measurement and control of product quality, and other applications requiring fast, accurate analysis.

Operational principles are outlined in a schematic diagram and explanatory text. The two-page literature includes the instrument's specifications for range, accuracy, sensitivity, zero drift, speed of response, and other features. Source: **Mine Safety Appliances Co., 201 North Braddock Avenue, Pittsburgh 8.**

Butterfly valve

. . . using rubber seat, called the Monoflange Mark II, is illustrated and described in new available Bulletin 10JR. The catalog has been designed to be a working tool for engineers and users of this type of equipment. The publication offers complete specifications, dimension drawings, waterflow data, gas-flow data, weights and freight rates, and prices. Source: **Henry Pratt Co., 319 West Van Buren Street, Chicago 7.**

Wrench-size

. . . figuring method for any bolt or nut diameter is featured in new 12-page Catalog 62. The literature deals with reversible ratchet wrenches, including new ½-in. square drive socket sets, available in 10-point and 12-point sizes.

Specifications and details are given for Warnock strap wrenches, Swaco railroad-car movers, and Hopper car wrenches. Also described are reversible ratchet wrenches for special applications. Source: **Lowell Wrench Co., Worcester 4, Mass.**

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ORIGINATORS OF BETTER METHODS AND DEVICES FOR MORE ACCURATE OIL WELL SURVEYS AND EFFICIENT DIRECTIONAL DRILLING
ORIGINATED first straight hole instrument (the Syfo Clinograph) generally accepted by the industry.
ORIGINATED only gyroscopic bore hole directional instrument in use in the United States.
ORIGINATED use of non-magnetic drill collars—an outstanding contribution to directional drilling.
ORIGINATED orientation of directional drilling tools in the bottom of hole. (Directional drilling could not be economically done without this Sperry-Sun method and the use of non-magnetic drill collars.)
ORIGINATED the taking of side wall cores.
. . . AND SPERRY-SUN IS STILL THE LEADER WITH THESE OUTSTANDING INSTRUMENTS AND SERVICES
• SPERRY-SUN MAGNETIC DIRECTIONAL SINGLE SHOT
• SPERRY-SUN E-C INCLINOMETER
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▶▶▶ Equipment Men Notes

W. C. Norris Mfr. appoints

K. M. Cook

...Kenneth M. Cook, former sales representative at Abilene, to sales manager of the company's Central Division with offices in Tulsa. He succeeds J. A. Getty, Jr., recently appointed head of the General Products Engineering Division.

Ed Chaney will succeed Cook at Abilene. Chaney previously was with Iverson Supply Co. for 2 years.

Segelhorst named chief engineer

A. V. Segelhorst

... and director of research for Bowen Itco, Inc., with headquarters in Houston. The position was formerly held by C. B. Greer who resigned. August V. Segelhorst was chief engineer for S. R. Bowen Co. prior to joining Bowen Itco a year ago.

The Houston company further announced that William T. Lee is now engineer in charge of production engineering and that D. Jay Bond is engineer in charge of new tool development.

L. E. Blackwell assumes post

... of product sales engineer for the Instrumentation Product Group of Texas Instruments, Inc.'s Geosciences & Instrumentation Division. The report comes from O. F. Henning, industrial products sales manager.

Prior to joining TI, Blackwell was a sales engineer with Reliance Electric & Engineering Co. for 7 years. He will locate in the Instrumentation Product Group's Houston plant. Blackwell will provide service to TI customers in the fields of data recording, automation instrumentation, and production-testing equipment.

Aloysius M. Tullo becomes

... a group vice president of Worthington Corp., replacing Elston J. Tribble, who resigned. William A. Finn, general manager of Worthington's Holyoke (Mass.) Division, was promoted to general manager of the Harrison (N. J.) Division, succeeding Tullo. Frederick B. Seel, manager of engineering at Holyoke, became general manager there.

Bethlehem Supply shifts sales areas, personnel

... in a major organization revamp. The report comes from J. V. Spalding general sales manager of Bethlehem Steel Co.'s Supply Division. C. C. Crider, former general manager of stores, has been appointed general manager of regions and will continue to locate at the Tulsa home office.

The Louisiana Gulf district and the South Texas district have been combined to form the new Gulf Coast region under the supervision of H. L. Hawkinson, Jr., former division sales manager in Houston. O. H. Crowe, previously manager of the South Texas district, has been made assistant to the regional manager and will maintain an office in Beaumont. W. J. Vark, manager of the Louisiana Gulf district, also becomes assistant to the regional manager and will head an office in New Orleans.

The newly formed South-Central region will have its headquarters in Dallas under H. V. Harder, previously tubular sales manager for the Central Division. The Mid-States region will have headquarters at Wichita under the direction of M. R. Griffith, former Kansas district manager. W. T. Davis assumes the post of assistant to the regional manager, moving up from Oklahoma district manager.

The West Texas and Texas Panhandle areas have been combined into the Southwestern region. It's composed of New Mexico except for the Four Corners area and the southern half of Arizona. Arthur Weber, Jr., takes over as regional manager from his previous post as Central Division sales manager. Headquarters are in Midland, Tex. E. R. Phillips, formerly Panhandle district manager, will assist Weber while maintaining an office in Amarillo.

The Rocky Mountain region will be supervised by E. S. Lewis, former Rocky Mountain district manager. He will locate at Denver.

KEY EXECUTIVES involved in Bethlehem Supply Division's major organizational change are, standing, from left: H. A. Wilson, Arthur Weber, Jr., E. S. Lewis, M. R. Griffith, H. L. Hawkinson, Jr., and H. V. Harder. In the front row, from left, are: C. C. Crider, J. V. Spalding, and C. R. Zimmerman.

Robert D. Crane named director

... of purchases and traffic of Dresser Industries, Inc., filling the post vacated by the retirement of Robert C. Kelley.

Crane moves into the post from his former position as assistant director of purchases. Previous to joining the Dresser staff in 1958, he was manager of purchases at Dresser Mfg. Division in Bradford, Pa. In his new job, Crane will have the responsibility for directing purchases, traffic, and material cost control for all Dresser divisions.

Crane Co. enters agreement

... to acquire the operating assets of National-U. S. Radiator. Crane will operate the organization as a subsidiary or as a division. Present National-U. S. management and employes, under the direction of President T. B. Focke, will be retained.

Southwest Industries enlarges

... its engineering and sales staffs by making three new appointments.

Robert W. Andrews, formerly with the consulting engineering firm of Prengle, Dukler & Crump, has been named to serve as a process engineer. H. George Wernette has joined the Houston firm as a sales engineer.

IN TESTING TOO!
it's people who make the difference...

Even the most efficient... up-to-date, formation testing equipment is only as good as the men behind it. Uncountable numbers of potential wells have been lost and pay zones overlooked for lack of that one essential ingredient... field-proven experience.

The facts are hidden below the surface, invisible to the naked eye, and must be skillfully brought up by proven tools and correctly interpreted and analysed by experienced testers. When you call for Formation Testing Service, you deserve the most reliable testing data and reports that can be obtained... data that will aid you in making future plans and decisions to drill ahead or set casing for production. When a Halliburton Tester is at your well, he feels, and is, dedicated to the task at hand ...for helping protect your investment... for providing you the *truest possible* down-hole facts, it's the Halliburton Tester who WILL make the successful difference.

With the backing of *Halliburton knowledge and technical research of over a quarter century,* he is the best qualified, most experienced and dependable tester in the oil industry today... giving you unparalleled service.

The service that is indispensable when you must have the down-hole facts.

Call your Halliburton Tester, today!

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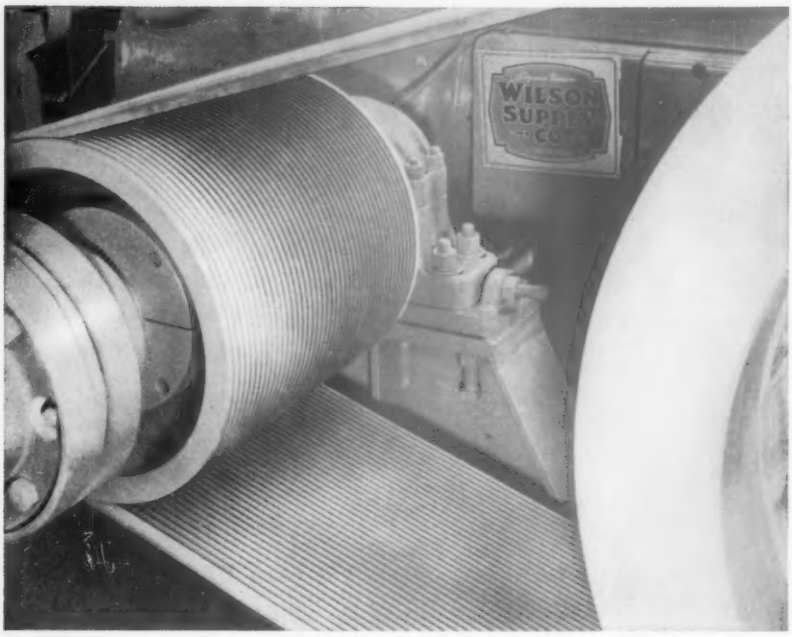
Wherever oil men work, they depend on

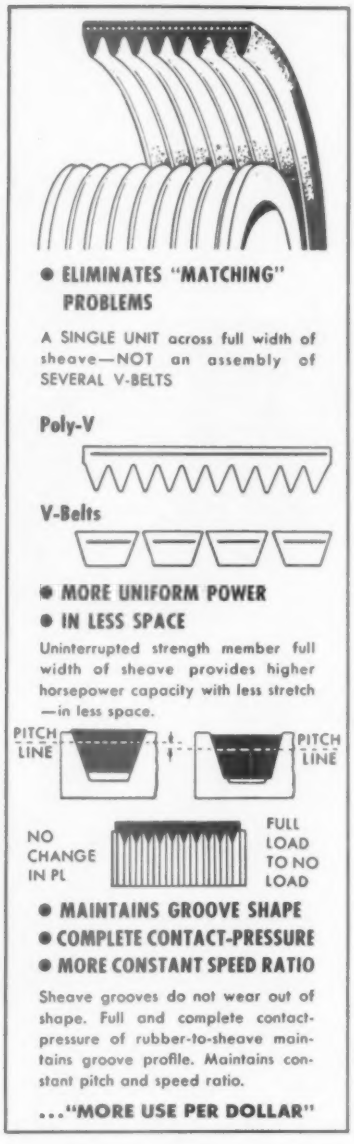


When you change drives...
Don't Settle for *Less* than the BEST

CONVERT TO RELIABLE R/M POLY-V® DRIVE!

This oilfield compressor drive was rough on V-belts . . . until Wilson Supply Company installed trouble-proof R/M Poly-V Drives on all 200 HP units. Today, R/M's patented, space-saving transmission drive assures a degree of power-packed performance and dependability not possible with any available V-belt drive!

Major causes of V-drive trouble are engineered *out* of Poly-V Drive. It features a single unit, V-ribbed belt—*not* an assembly of V-belts that become unmatched and prevent complete power delivery. Full contact between Poly-V Belt ribs and specially designed sheave grooves keeps belt position constant . . . maintains groove shape and profile regardless of wear—with less wear on belt and sheaves even under toughest drive conditions! Speed ratio is unchanged. And because Poly-V Belt has uniform, uninterrupted strength member across the sheaves, Poly-V Drive will reliably deliver up to 50% *more* power in the same space as a multiple belt drive—or equal power in as little as ⅔ the space!


● ELIMINATES "MATCHING" PROBLEMS
A SINGLE UNIT across full width of sheave—NOT an assembly of SEVERAL V-BELTS
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V-Belts
● MORE UNIFORM POWER
● IN LESS SPACE
Uninterrupted strength member full width of sheave provides higher horsepower capacity with less stretch —in less space.
PITCH LINE
PITCH LINE
NO CHANGE IN PL
FULL LOAD TO NO LOAD
● MAINTAINS GROOVE SHAPE
● COMPLETE CONTACT-PRESSURE
● MORE CONSTANT SPEED RATIO
Sheave grooves do not wear out of shape. Full and complete contact-pressure of rubber-to-sheave maintains groove profile. Maintains constant pitch and speed ratio.
..."MORE USE PER DOLLAR"

Let an R/M representative show you how Poly-V* Drive can give you more power delivery, more drive dependability . . . "More Use per Dollar" than the drive you now use. Just two cross sections of Poly-V Belt meet every heavy duty power requirement. Write for Bulletin M141.

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*Poly-V is a registered Raybestos-Manhattan trademark.

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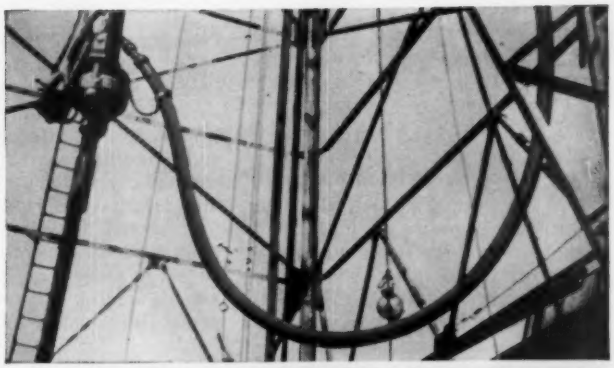
OTHER RUBBER PRODUCTS FOR THE PETROLEUM INDUSTRY

MUD PUMP INTAKE HOSE • VIBRATION HOSE • SHIP AND BARGE LOADING HOSE • TANK TRUCK AND TANK CAR HOSE • PROPANE HOSE • FUEL OIL TRUCK HOSE • FIRE HOSE

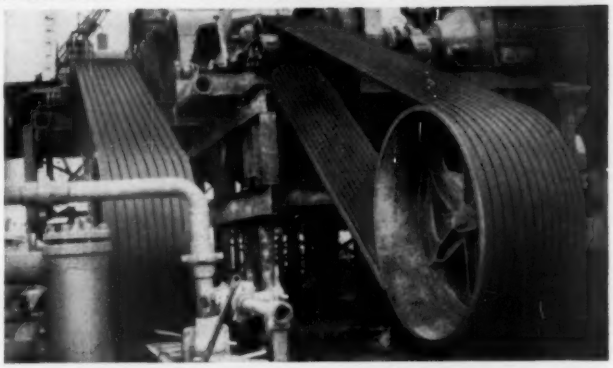
R/M Products



RAY-MAN ROTARY HOSE

Strong • Safe • Flexible

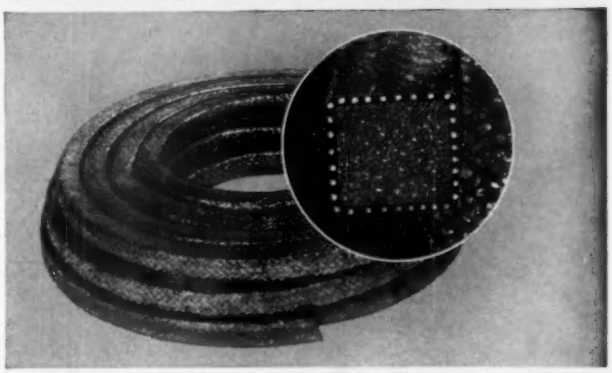
Special high-tensile steel cable wire reinforcement, precision wound under tension, gives Ray-Man CBL Rotary Hose unequalled strength and flexibility for safer, easier handling and make-up on the rig. Resists kinking and accidental crushing in transport . . . holds steadier in the derrick *without whipping*—even under high pressures of deep drilling. Streamlined, built-in coupling has no protruding lugs or flanges—features R/M leak-proof "Lip-Lok" seal that tightens under pressure to prevent blowouts! Write for Oilfield Hose Bulletin M651.



CONDOR LS V-BELTS

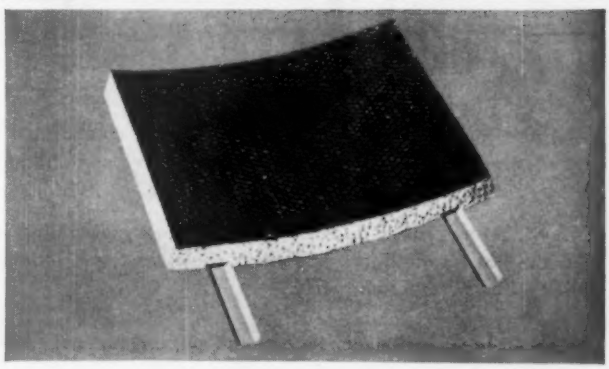
Length Stabilized

No whip, no wobble, no weave—no undue stress or V-belt turnover on long center, heavy duty oilfield drives! Condor LS V-Belts are *length stabilized* to give a degree of lateral and longitudinal stability *without stretch* never before possible. They're length *certified*, too . . . measured, tagged and vacuum packaged to assure positive length control and freshness from factory to field to drive . . . and they now transmit 40% more power than conventional V-belts at no increase in cost! Write for Bulletin M210.



R/M UNIVERSAL PLASTIC PACKING

Made of long-fiber asbestos, a special binder and non-frictional metal, it's the best to use for sealing on centrifugal pump shafts, valve stems, reciprocating rods, and other equipment. Designed specifically for use against gasoline, fuel oil, and other petroleum products. This packing is available in all standard sizes in increments of 1/16 in., and can be had in both spiral and ring forms, butt or bevel cut.



RAY-MAN BRAKE BLOCKS

Long lasting Ray-Man 635-D Brake Blocks cost less because they wear longer. Made of extra-large asbestos yarns, special saturant, wire reinforced. Resist bleeding, won't glaze or carbonize. Ray-Man blocks are available in drilled or countersunk sets or in the R/M patented Key-Lok style. Patented key-lok gives more friction surface, blocks slide on and off to speed relining. Make hole faster. Cut cost with Ray-Man. Call your nearest R/M warehouse today or contact your closest authorized R/M oilfield equipment supply store located in major oil producing areas.

RM930

RAYBESTOS-MANHATTAN, INC.

PASSAIC, NEW JERSEY

Brake Lining and Blocks • Clutch Facings and Automatic Transmission Friction Parts • Conveyor and Power Transmission Belts Industrial Hose • Rubber Covered and Lined Equipment • Mechanical Packings and Gasket Materials • Asbestos Textiles • Engineered Plastics • Sintered Metal Products • Abrasive and Diamond Wheels • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

He previously was with Warren Petroleum Co. A new chemical-engineering post will be filled by Thomas H. Ells, formerly with Atlantic Refining Co.

Jack Parker is district manager

... in Kansas City for Blackmer Pump Co., according to E. H. Lanthorn, vice president and sales director of the Grand Rapids, Mich. firm. Parker has been a sales engineer with Blackmer in Chicago for 3 years. Before joining the company in January 1957, the new district manager worked in sales for Fairbanks-Morse Co. for 4 years.

New corporation is formed

... with headquarters in Houston, according to Ralph P. Watkins, president. The firm—International Controls Corp.—is engaged in the design and manufacture of a wide range of automatic and remote-control equipment for petroleum production and for gas and liquid pipelines, as well as for various chemical and petrochemical processes. Initial emphasis will be on the solution of problems in the petroleum industry.

Watkins has been associated with Lockheed Aircraft Corp., IBM Corp., Hughes Aircraft Corp., and Southwestern Industrial Electronics Co. He resigned from SIE to form the new organization.

Also associated with Watkins in the new concern are Thomas J. Reynal, Robert L. Deutsch, Lee B. Tully, Jr., and John H. Maness.

Weatherford Oil Tool Co. names

... Weldon Martin as executive vice president, and revamps the company's organizational chart. As vice president of finance the last 2 years, Martin has also directed programing of subsidiary companies. Heading operations in the Eastern Hemisphere are Thomas E. Remp, Jr., of Hannover, West Germany, vice president distribution (foreign); and Addison Love, vice president chief engineer and works manager (foreign). Appointed vice presidents at large were F. H. Drury, with Weatherford Oil Tool Co., Ltd., Edmonton, Alta.; and R. H. Hume, president of Fabrimex S.A. de C.V., Mexico City, a subsidiary company.

Weldon Martin

James C. Niver is now vice president of finance and Walter Carter is vice president of the Ranch Division. Weatherford vice presidents now number nine.

Fischer & Porter Co. promotes

... Donald T. Cusack to eastern regional sales manager, in which post he will be responsible for the New England, Eastern New York, and Northern New Jersey sales regions. He was formerly district manager of the New York area.

Ralph J. Fittipaldi has been named district sales manager of the New York office. He was formerly a sales engineer in New York. Eugene R. Klotz, former Philadelphia district sales manager, has been appointed market development manager for flowmeters. C. Jackson Levis, district sales manager of the Buffalo office, takes over as district manager of the Philadelphia sales office.

Kaiser Steel Corp. appoints

... Fred G. Brear and William M. Vaughey to new executive positions in the corporation's sales division at the general sales offices in Oakland, reports Alan Grey, assistant general sales manager. Brear has been named to the newly created post of manager of customer service. Vaughey takes over as manager of administration, general sales.

Brear will assume responsibility for

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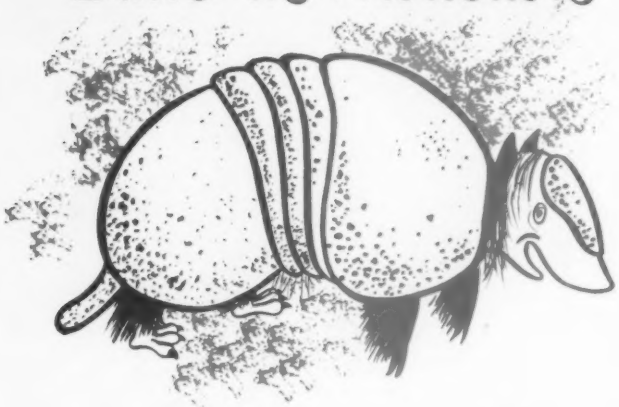
Built-in Protection



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Nature has a way of providing for all her creatures a means of protection. In any emergency, they all have something on which they can rely to bring them through safely.

BEACON has taken a lesson from Nature by providing its dealers with that "something on which they can rely"—UNEQUALLED SERVICE—in any emergency.

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ANOTHER WAY RCA SERVES BUSINESS THROUGH ELECTRONICS

It's what's inside RCA's Transistorized "LD" Radio that makes it your greatest value!

Take a look inside the new RCA 2-Way Radio and you'll see an array of advanced improvements that give you new economy, dependability and performance.

Sensibly designed with you in mind, the "LD"* employs standard transistors only in circuits where long experience proves their reliability . . . where they can do the best job of cutting down on costly battery drain. You get maximum profit-earning "on air" time, too, because circuits are "Road Map" coded for fast, sure servicing guidance.

You'll like the extra measure of dependability you get with Security Sealed Circuits assuring top performance under the most rugged operating conditions. And you'll cheer the "LD's" booming voice—thanks to a powerful five watts of audio.

Priced considerably lower than other transistorized 2-way radio equipment—comparable in cost to conventional tube-type radios—the "LD" is your greatest value.

So if it's economy, dependability and performance you want in 2-way radio—if you are looking for a way to improve the efficiency of your operation—get the whole *RCA* story, right away.

Your RCA Representative will be glad to explain further why RCA "LD"
**(Low Drain) equipment is today's best buy in 2-Way Radio. Or for complete descriptive literature — write RCA, Dept. CE-89, Bldg. 15-1, Camden, N. J.*

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Hundreds of Flying "R" representatives working out of 58 Republic Supply Centers SERVE CUSTOMERS BETTER in Arkansas, Colorado, Illinois, Kansas, Louisiana, Nebraska, New Mexico, North Dakota, Oklahoma, Texas, and Wyoming . . . SERVE THEM BETTER with a full line of supplies that features the best pipe money can buy — Republic Electric Resistance Weld and Seamless Casing and Tubing, Electric Resistance Weld Line Pipe.

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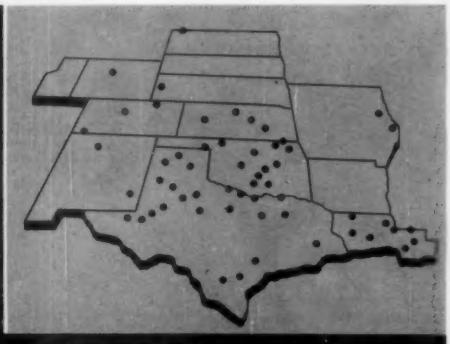

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THE GORMAN RUPP COMPANY
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Centrifugal Pumps.

HARRISBURG STEEL COMPANY
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LOS ANGELES BOILER WORKS, INC.
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Welding Caps—Dished & Flanged Heads.

MILLS IRON WORKS, INC.
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Seamless Swage Nipples, Bull Plugs & Welding Reducers.

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OSECO Silvertop Fusible Plugs with renewable inserts for all types OIL COUNTRY BOILERS.

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VOLCANO BURNER COMPANY
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Volcano Superior and Gulf States All Steel Gas Burners for OIL COUNTRY BOILERS.

WESTERN SAFETY BARREL STAND
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Stand lifts, holds, tilts 55 gal. barrels. Prevents spillage—easily loaded.

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XL Steel Pipe Couplings for OIL COUNTRY TUBULAR PRODUCTS.

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sales-division customer-service standards. Vaughey will be in charge of coordinating administrative functions of the company's sales offices. He will also supervise the handling of pricing and government contracts.

Bovaird Supply Co. announces

R. G. Ayers

. . . three advancements in management positions, following the annual stockholders' and directors' meeting held in Tulsa.

Roscoe G. Ayers was advanced from vice president and general manager to senior vice president. Raymond E. Batchelor was promoted from vice president and general sales manager to vice president and general manager. William J. Bovaird takes over

R. E. Batchelor

W. J. Bovaird

as vice president in charge of sales from his former post as sales manager.

The company operates 20 stores and seven sales offices in Illinois, Kansas, Oklahoma, New Mexico, Texas, Louisiana, and Mississippi, and is beginning its eighty-ninth year of service to the petroleum industry.

Warner & Swasey Co. appoints

. . . Midwestern Engine & Equipment Co., Inc., of Tulsa, as a distributor for all of Oklahoma for the Hopto line of excavating machines, manufactured by the company's Badger Division. The announcement was made by I. T. White, manager of construction-equipment sales of the Cleveland manufacturer. The Hopto line covers a variety of hydraulic excavators ranging from truck-mounted and crawler-mounted machines down to snap-on models for use on small tractors.

Alloy Steel Products Co. names

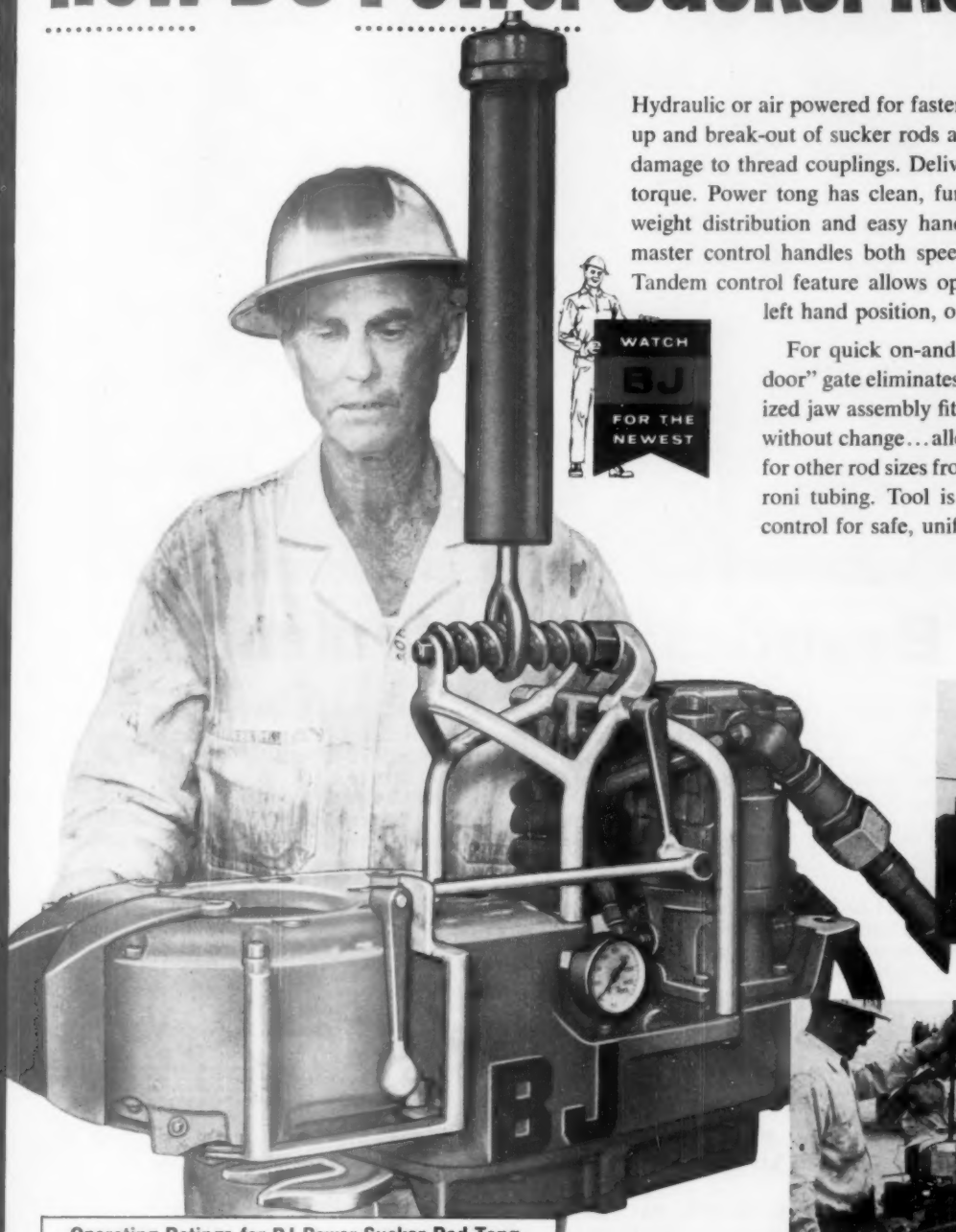
. . . Robert E. Ohlson as company representative in St. Louis, where he will be responsible for sales in Missouri, Kansas, and Oklahoma, and portions of Illinois, Indiana, Kentucky, and Texas.

Before joining the Linden, N. J. firm, Ohlson was with Allied Chemi-

For quick, money-saving make-up

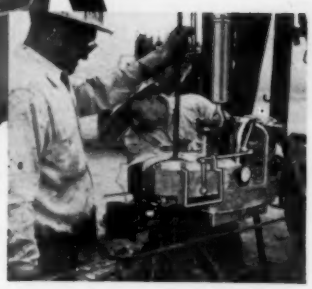
without damage to rod thread couplings

new BJ Power Sucker Rod Tong



Hydraulic or air powered for faster, safer, more uniform make-up and break-out of sucker rods and macaroni tubing, without damage to thread couplings. Delivers up to 1,100 foot-pounds torque. Power tong has clean, functional design for balanced weight distribution and easy handling by one man. A single master control handles both speed and direction of rotation. Tandem control feature allows operation from either right or left hand position, or from the front.

For quick on-and-off action, a new "swinging door" gate eliminates hand latching. A single unitized jaw assembly fits ⅝", ¾" and ⅞" rod sizes without change... allows fast, unitized jaw change for other rod sizes from ½" to 1⅛" and for macaroni tubing. Tool is equipped with torque gage control for safe, uniform make-up.



ABOVE: Old-fashioned hand methods are slow and hard . . . can also damage rod thread couplings.

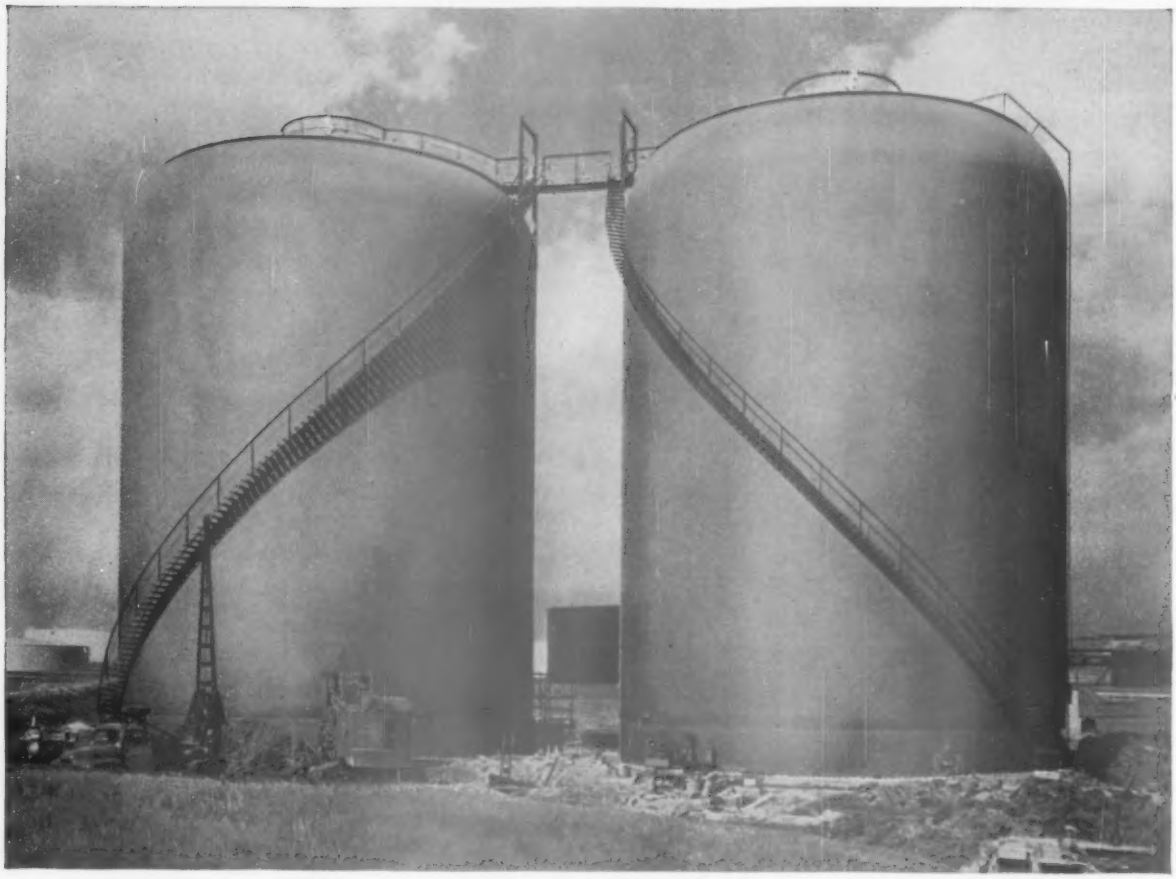
LEFT: New BJ Power Sucker Rod Tong does the job quick, safe and sure!

Operating Ratings for BJ Power Sucker Rod Tong			
MAX. TORQUE	MAX. SPEED	POWER REQUIREMENTS	
		0-1,000 psi	1,000-2,000 psi
1,100 ft/lbs	141 rpm	30 gpm	15 gpm
1,100 ft/lbs	117 rpm	25 gpm	12 gpm

Byron Jackson Tools, Inc.

A SUBSIDIARY OF BORG-WARNER CORPORATION

P.O. Box 2017-A, Terminal Annex, Los Angeles 54, California



Two Beauties for Butadiene

"Cool" is the word for these ellipsoids . . . they're built to store butadiene at just-above freezing temperatures, which in Texas means about 45° below ambient temperature. They're 60 feet in diameter and 62 feet high, with storage capacity of 40,000 barrels each.

Butadiene is a problem child when it comes to storage. Vessels must be cold-storage as well as safety-vaults. Operating in an ambient temperature of 80° F the butadiene liquid in these twin ellipsoids had to be refrigerated to 35°F at 10 psig so that it could be kept "indefinitely."

At higher temperatures butadiene will deteriorate. Four inches of glass fiber insulation help maintain the low storage temperature to guarantee the quality of the butadiene.

It takes a heap of know-how and experience to build tanks that meet such stringent requirements. We are proud to have been given the opportunity to build these two ellipsoids for Hess Terminal at Galena Park, Texas.

For any type of process vessel made of metal plate, consult the Pittsburgh-Des Moines Steel Company.

HAMONDTANK — 12 plants to serve you coast to coast — PDM ENGINEERS · FABRICATORS · CONTRACTORS

Pittsburgh-Des Moines Steel Company

Plants at PITTSBURGH, WARREN, BRISTOL, PA. • BALTIMORE • BIRMINGHAM • DES MOINES PROVO, UTAH • CASPER, WYO. • SANTA CLARA, FRESNO, STOCKTON, CALIF.

Sales Offices

Atlanta 5 • Baltimore 26 • Boston 10 • Bridgeport 5 • Chicago 3 • Dallas 1 • Denver 2 • Des Moines 8 • El Monte • Fresno • Jacksonville • Los Angeles 57 • Newark 2 • New York 17 • Pittsburgh 25 • Sacramento • Santa Clara • Seattle 1 • Stockton

licensees and sales offices in many foreign countries including Argentina, Australia, Belgium, Brazil, Canada, Chile, Colombia, England, France, Haiti, India, Italy, Japan, Mexico, Netherlands, Peru, Puerto Rico, Sweden and W. Germany.

cal & Dye Corp. in Morristown, N. J. Prior to his St. Louis transfer, he was Aloyco's representative in the New Jersey and Eastern Pennsylvania territories.

William A. Lockwood is named

. . . a vice president by The First National City Bank of New York. Formerly an assistant vice president, Lockwood is with the petroleum department in the bank's Special Industries Group—a part of the National Division.

Davison Chemical Division shifts

. . . from a territorial to a product supervisor type of operation. Representatives who previously sold Davison industrial chemicals in a restricted area will have national responsibilities for single products or groups of closely related products.

C. Victor Bolles has been appointed sales supervisor for gas-dehydration silica gels, operating out of the Davison office in Houston. He will be responsible for continuing the development and expansion of sales of silica gel in natural gas and hydrocarbon-recovery processes. Bolles will also coordinate technical service in the product category.

Davison Chemical is a division of W. R. Grace & Co.

Foster Wheeler Corp. elects

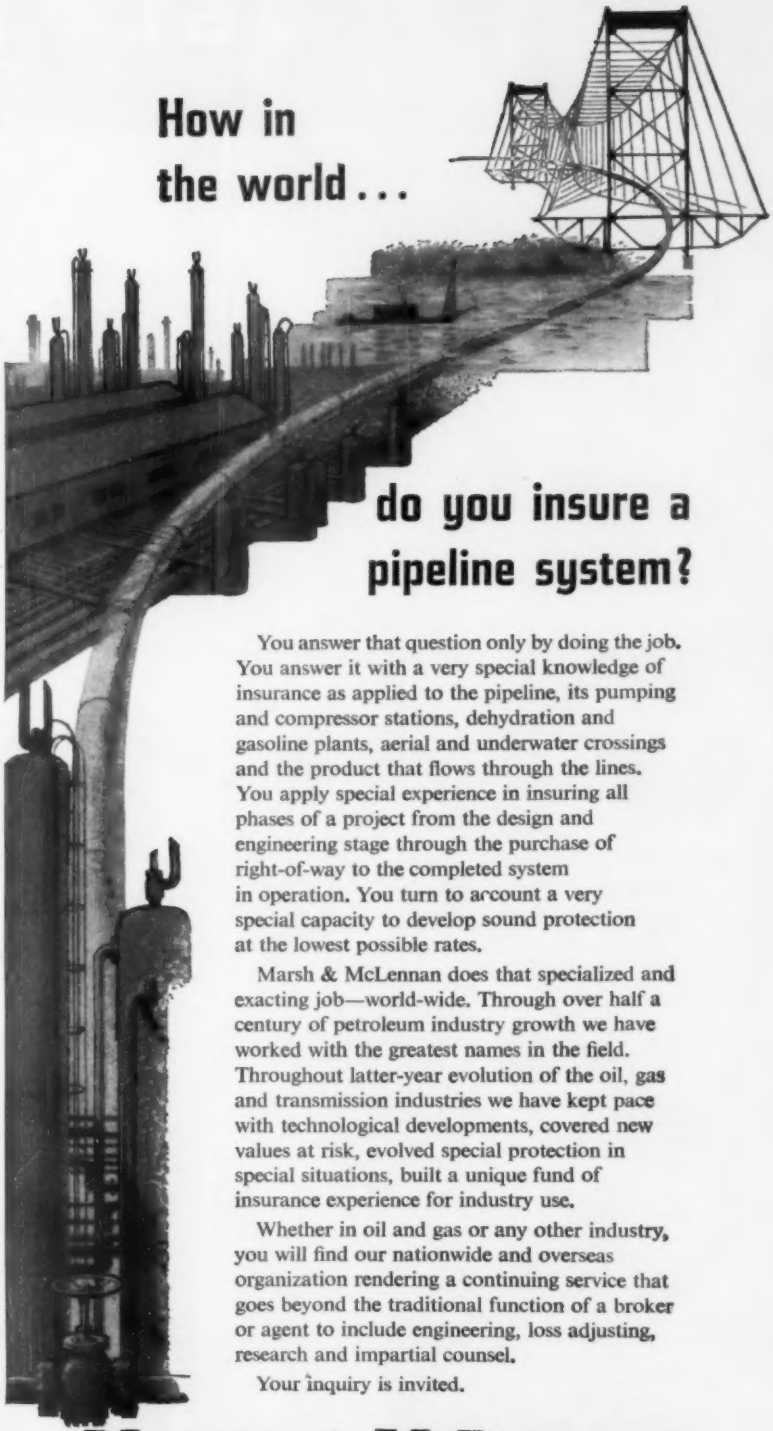
. . . W. L. Martwick to chairman of the board at a directors' meeting held recently in New York. At the same meeting, John E. Kenney was elected president and chief officer to succeed Martwick. Clark P. Lattin, Jr., vice president in charge of sales, was elected a corporation director.

J. O. Broomfield takes post

. . . as general manager of Core Well, Ltd., Canadian subsidiary of American Coldset Corp., of Teterboro, N. J. Broomfield joined Core Well in 1957 as area manager in Dawson Creek, B. C., and a year later assumed a similar post in Calgary. As general manager he will serve at the firm's headquarters in Edmonton.

Wolverine Tube reports opening

. . . of new district sales offices in Los Angeles and San Francisco. Until the present, Wolverine Tube Division of Calumet & Hecla, Inc., has been represented by Van D. Clothier, Inc.,



You answer that question only by doing the job. You answer it with a very special knowledge of insurance as applied to the pipeline, its pumping and compressor stations, dehydration and gasoline plants, aerial and underwater crossings and the product that flows through the lines. You apply special experience in insuring all phases of a project from the design and engineering stage through the purchase of right-of-way to the completed system in operation. You turn to account a very special capacity to develop sound protection at the lowest possible rates.

Marsh & McLennan does that specialized and exacting job—world-wide. Through over half a century of petroleum industry growth we have worked with the greatest names in the field. Throughout latter-year evolution of the oil, gas and transmission industries we have kept pace with technological developments, covered new values at risk, evolved special protection in special situations, built a unique fund of insurance experience for industry use.

Whether in oil and gas or any other industry, you will find our nationwide and overseas organization rendering a continuing service that goes beyond the traditional function of a broker or agent to include engineering, loss adjusting, research and impartial counsel.

Your inquiry is invited.

MARSH & McLENNAN

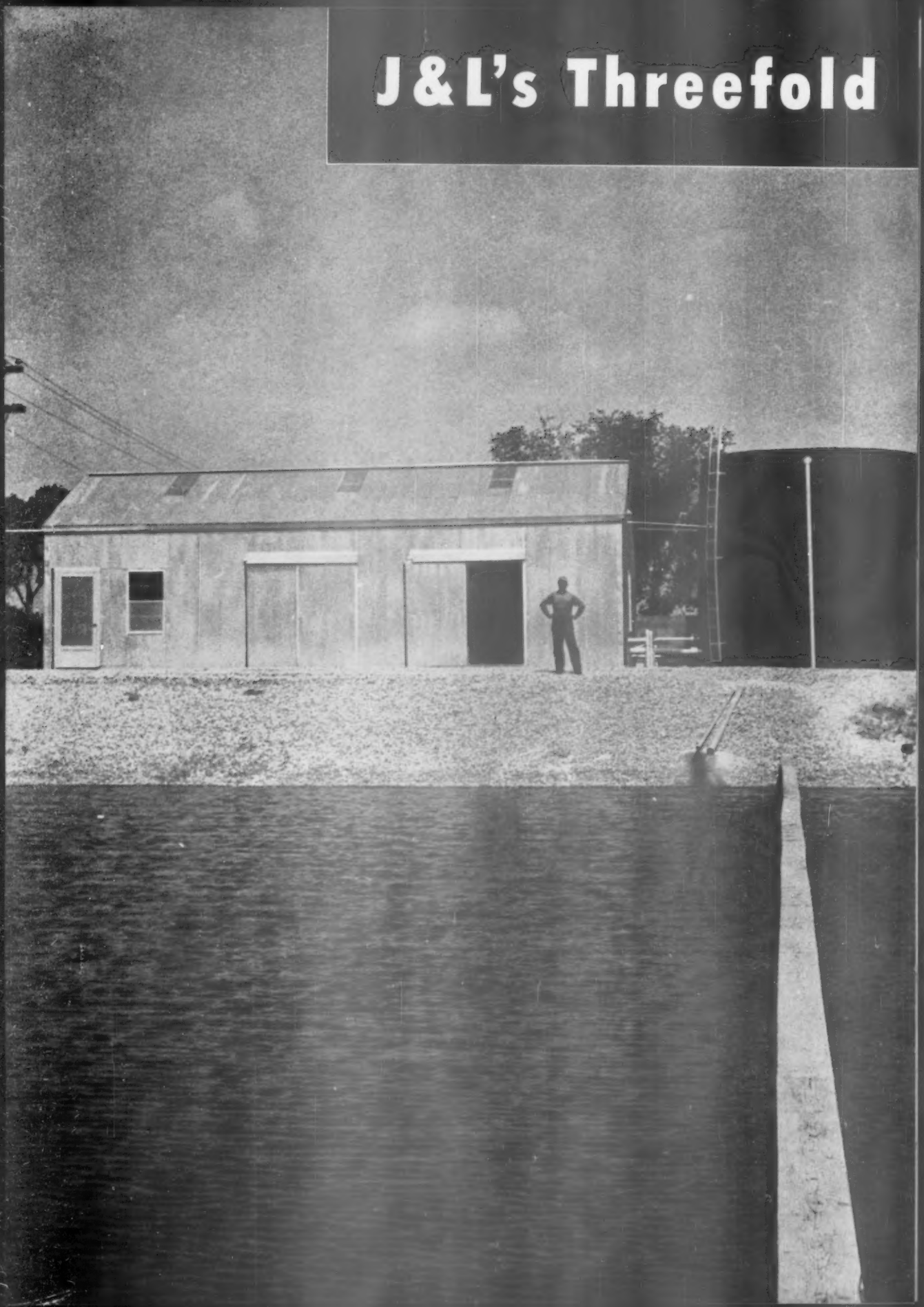
INCORPORATED

Insurance Brokers

CONSULTING ACTUARIES · AVERAGE ADJUSTERS

Chicago New York San Francisco Minneapolis Detroit Los Angeles Boston Pittsburgh Seattle St. Louis Indianapolis St. Paul Portland Buffalo Duluth Atlanta New Orleans Tulsa Milwaukee Phoenix Cleveland Norfolk Charleston Oakland Montreal Toronto Vancouver Calgary Havana Caracas London

J&L's Threefold



Service for Waterflooding

You have three good reasons for calling your J&L Supply man when considering a waterflood program.

First, J&L's waterflood engineering group has the background and experience for developing *practical* plans.

Second, J&L handles the equipment to carry out such plans. You get *real* economy. The J&L target is maximum recovery, with equipment designed for long life and dependable performance.

Third, you have J&L Supply stores where you need them, stocked with supplies and replacement parts.

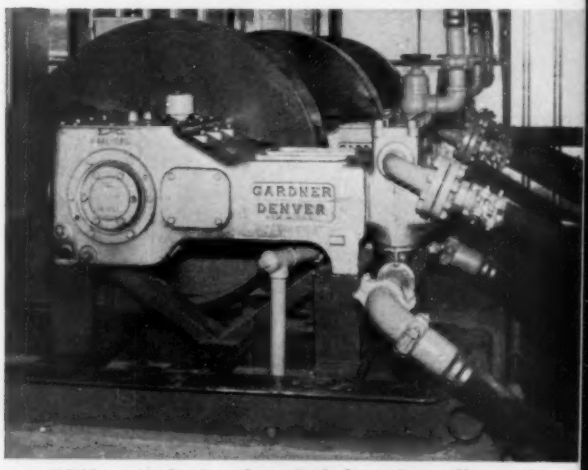
This waterflood package offered by J&L Supply — experienced engineering, quality equipment and exceptional field service — is your assurance of maximum recovery at minimum cost.

Jones & Laughlin

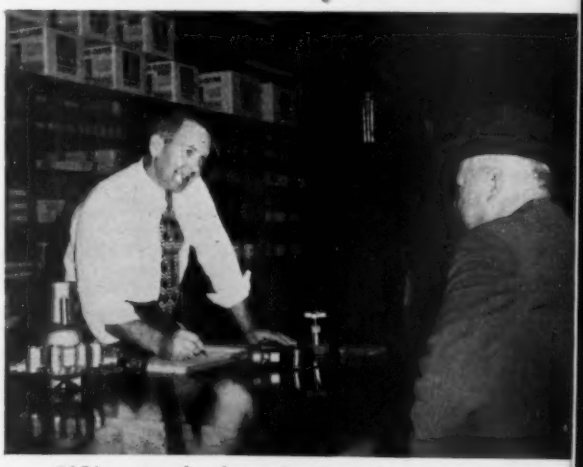
SUPPLY DIVISION - Tulsa

If it's sold by J&L....
It's the best available 84

J&L's waterflood engineering team plans for efficiency and economy in flood operations.



J&L's waterflood package includes only quality equipment — more trouble-free performance hours per dollar invested.



J&L's network of supply stores is your guarantee that supplies and parts are available where and when you need them.

J&L-designed and J&L-executed waterflood projects are the last word in efficiency and ultimate economy.

West Coast agent for the company. Now the agent will serve in a sales-counseling capacity.

This sales-district reorganization involves the following personnel changes: John A. Marshall, appointed San Francisco district sales manager; J. J. Boyett, sales representative in Marshall's district; H. F. Powell, Los Angeles district sales manager; W. C. Glass and C. W. Barker, sales representatives in Los Angeles; R. C. Crowe, New York district sales manager; and R. B. Davis, manager of industrial sales at Wolverine's administrative office in Allen Park, Mich.

Three elected to vice president

. . . by the board of directors of Stone & Webster Service Corp. L. S. Storrs, Jr., becomes executive vice president of the firm, and named to vice president posts are Earl J. McConnell and George L. Schofield.

Storrs, who joined Stone & Webster in 1933, was elected a vice president in 1954 and a director last year. McConnell joined Stone & Webster in 1947 as a senior gas engineer and became head of the Service Corp.'s gas department in 1951. He went to New York from Oklahoma Natural Gas Co. where he was chief engineer. Schofield is an operating sponsor for several of the corporation's gas-utility clients and will continue in that capacity. He joined Stone & Webster in 1946.

Ethyl Corp. makes several

. . . promotions, announces M. P. Murdock, vice president in charge of sales. S. T. Pruitt, former domestic sales manager, has been named general

S. T. Pruitt

Stuart Forbes

sales manager and will be responsible for all sales to oil companies in the United States. Stuart Forbes becomes domestic sales manager, reporting to Pruitt. He will have direct-line authority over the sales department's four regions.

J. J. Frey, assistant vice president, will continue to direct export sales. W. K. McCulloch has been named to the new post of sales manager for petroleum additives, which will cover the sale of all products to oil companies with the exception of antiknock compounds. McCulloch will report to Forbes. C. F. Naylor has been named administrative assistant to the vice president in charge of sales.

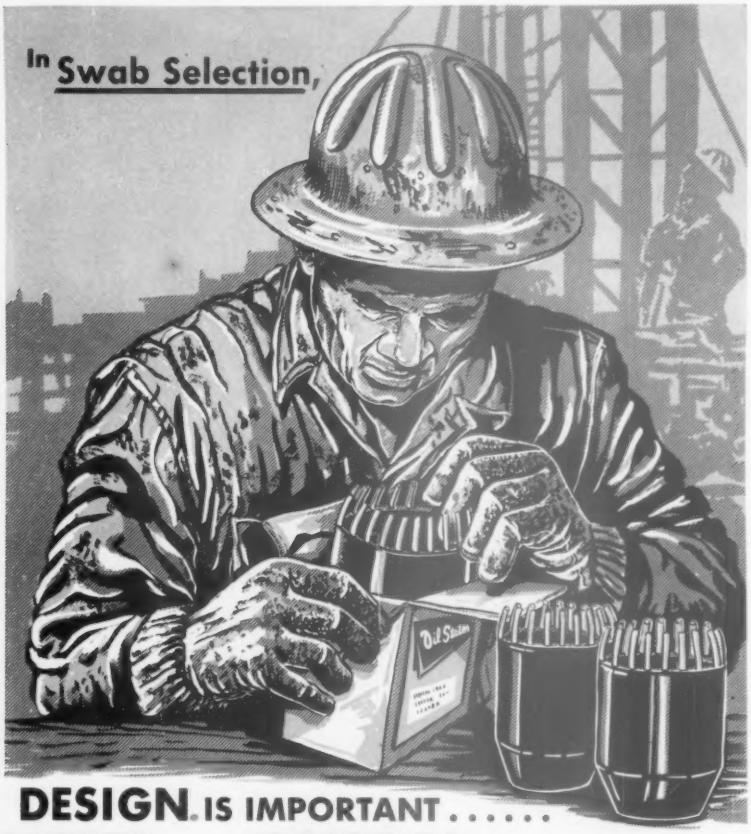
In other promotions, D. S. Flynn succeeds Forbes as manager of the central region in Chicago; R. D. Bushell succeeds Flynn as assistant regional manager of the eastern region in New York; and W. J. Rusher succeeds Bushell as manager of the New York district.

Orville P. Edwards sets up

. . . a consulting firm in Tulsa. Orville P. Edwards Co. will specialize in heat and corrosion-resistant castings design and construction for refining and petrochemical facilities. Edwards formerly was director of research and development for John Zink Co., Tulsa. He had been with the company for 20 years.

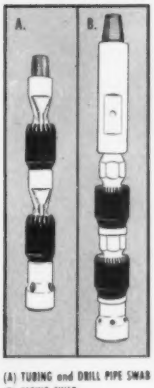
G.E. Nevill is appointed

. . . engineer of standards in the product-engineering department of Cameron Iron Works, Inc.'s Pressure Control Division. This function includes active representation of the company on technical committees. Nevill will



DESIGN IS IMPORTANT . . . . . .

RUBBER IS VITAL!



(A) TUBING and DRILL PIPE SWAB
(B) CASING SWAB

Efficient Design means trouble-free operation and more fluid lifted per trip . . .

Engineered Rubber means more trips per cup, more fluid per hour.

OIL STATES pioneered the modern swab design . . . was first with the fluted mandrel . . . first with the free-moving cup for easy unloading and positive valving.

OIL STATES Swab Cups contain rubber engineered for oil field use. Compounded for swabbing by *oilfield rubber specialists* — tops in their field.

The rapid acceptance of the OIL STATES Swab is eloquent testimony to its excellence of design and superior performance. Use OIL STATES on your next swabbing job and be assured of . . . .

"Oil Field Rubber Products Of Matchless Quality."

Oil States OIL STATES RUBBER CO.

P. O. Drawer 152 • Arlington, Texas

further assist in the preparation or review of technical papers and releases and will assist in patent matters.

Swiss company is organized

. . . by Manning, Maxwell & Moore, Inc. in Fribourg, Switzerland. The new subsidiary—Manning, Maxwell & Moore, S.A.—will take over foreign operations of the parent company to provide closer cooperation, service, and sales assistance for the company's customers, licensees, distributors, and agents in all areas, except the Western Hemisphere. The latter will continue to be handled by the Export division.

C. A. Moore, chairman of the board of Manning, Maxwell & Moore, Inc., is chairman of the Swiss concern, and J. P. Waneck has been made managing director. J. S. Verhaeghe has been named manager of sales and service.

M. L. Talbert becomes veep

M. L. Talbert

. . . in charge of engineering of Security Engineering Division, one of the Dresser Industries, reports Security President John C. Helies. Talbert, formerly chief engineer for Security, now has responsibility for all engineering activities. He has been active in various capacities in the engineering of drilling bits for nearly 23 years.

Tom Wheatley Co. appoints

. . . Howard Crider as oil-field manufacturers representative in the Oklahoma, Kansas, and Panhandle region. Crider formerly worked for Gulf Oil Corp. and Creole Petroleum Co. in Venezuela, and has been in oil-field sales the past 10 years.

J. W. (Bill) Wallace becomes

. . . district salesman for Instruments, Inc., of Tulsa. with offices in Houston. Wallace has been placed in charge of all electronic and mechanical-instrument sales to the production and pipeline departments of oil companies in the gulf area. Previously he was a Houston branch salesman for National Tank Co.

Solvay Process Division makes

. . . six appointments in its sales department. Fred P. Boehm and Charles E. Varn are appointed assistant sales directors.

Robert E. Clagett succeeds Boehm as Pittsburgh sales branch manager, and G. Richard Barclay replaces Varn

with new **Carbo Zinc 11***

CARBOLINE'S NEW ZINC FILLED *INORGANIC* COATING FOR GALVANIC PROTECTION OF STEEL

Becomes water insoluble 20 minutes after application

Sudden rainfall, night condensation or rising tide will not wash it off or affect curing.

Carbo Zinc 11 is not only a new coating, it is a new *concept* in zinc filled inorganic coatings, with desirable properties not found in other protective coatings. In only 20 minutes the coating becomes insoluble in water. It can be applied directly to damp surfaces, in 90-100% humidity and at temperatures as low as 0°F.

Only one coat provides long-lasting galvanic protection to steel surfaces in marine, coastal and offshore environments. It is also insoluble in organic solvents, and is highly recommended for lining of solvent storage and cargo tanks. And look at its other outstanding characteristics:

- Prevents subfilm corrosion
- Excellent water, brine and solvent resistance
- Economical — low material, surface preparation and application costs
- Does not blister — cures from inside out
- No curing solution required
- Brush or spray application
- In non-immersion service, can be applied over a commercial blast, brush blast or wirebrushed surface

Write today for complete information, technical data, uses and sample of this remarkable new coating—Carbo Zinc 11.

**Patent applied*

carboline COMPANY

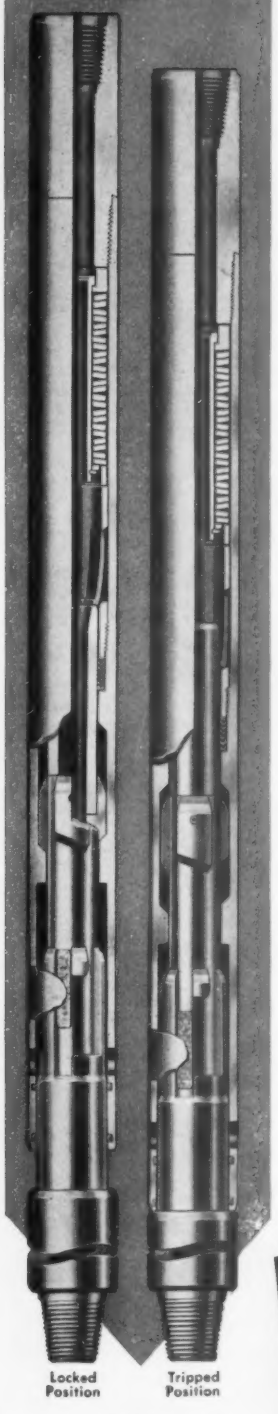
Coatings with Experience

32-S Hanley Industrial Ct.

For running in the drill string . . .

Positive JAR-DOWN ACTION

. . . plus Safety Joint protection!



THE SHAFFER-WAGGENER BUMPER SAFETY JOINT

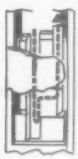
There is no other tool like the Shaffer-Waggener Bumper Safety Joint. It combines—in ONE tool—a choice of *jar-down* and *releasing* actions, both under complete control of the operator. What's more, the tool is so rugged it is run as part of the drill string to protect against stuck pipe.

In actual well service it has operated easily at depths below 18,000 feet, and has given no operating problems even in directionally-drilled wells with extreme slant.

Jar-Down Action

▶ **RUN IT IN THE DRILL STRING**—It is specifically designed to withstand the continuous vibration and heavy torque loads of today's drilling operations.

▶ **TO JAR DOWN** whenever the drill pipe threatens to stick—or to drive drill collars out of keyseats and to free 'balled-up" bits—simply slack off weight equivalent to about 2,000 feet of drill pipe onto the tool. This releases the tripping mechanism, automatically striking a sharp down blow. Raising the string automatically re-sets the tool for another blow—and blows can be struck repeatedly as fast as the string can be raised and lowered. And no torque or twisting strains are placed in string!



Releasing Action

▶ **TO RELEASE,** in the event jarring will not loosen the stuck string, simply trip the tool and apply reverse torque as the string is slowly raised. Only one-sixth turn of the tool rotates the drive keys into unlocking slots so that complete release is effected by continuing to raise the string.

ANOTHER ADVANTAGE—the tool transmits full torque loads in *either* direction through three rugged drive keys—not through easily-damaged threads. It is the strongest joint in the string—not the weakest, as with conventional safety joints.

Also, the tool can be re-connected again by simply lowering the top portion over the lower portion and reversing the releasing action. It is ideal for use in fishing strings!

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

37 YEARS

See the Shaffer section of your Composite Catalog.

as manager of the New Orleans sales branch. In addition, Jerome L. Hochenedel is named manager of Solvay's Houston sales branch succeeding S. O. Taylor, who is retiring after 33 years with the company. Richard A. Marshall is named manager of the organic-chemicals section, a post formerly held by Barclay.

Solvay is a division of Allied Chemical Corp.

Gilliland becomes sales engineer

. . . for Reilly Tar & Chemical Corp., according to J. H. Barnett, Jr., sales manager. Robert Gilliland will be attached to the Houston sales office as a representative in the coal-tar enamel pipeline coating division.

G-E names Walter G. Pree

. . . national accounts manager for mobile communications at General Electric's Communication Products Department headquarters in Lynchburg, Va. Formerly regional manager for two-way radio sales at Excelsior, Minn., Pree now will have responsibility for coordinating the company's two-way-radio negotiations with firms who do business on a nationwide basis. Additionally, he will handle the department's mobile-radio export orders negotiated through Canadian General Electric Co. and G-E's International General Electric Division.

Petrolite assigns D.C. Breland

. . . to its Petreco Division at Houston, where his work will pertain to chemical and electrical dehydration and other Petreco electric treating processes and equipment.

Breland comes from Hoil Engineering Co. Prior to going with Hoil, he was in Venezuela for 6 years with Mene Grande Oil Co., working with oil production and dehydration.

Walworth Co. renames

. . . one of its traditional lines of valves. Rolotork will now be used by the company to designate its high-pressure, steel, ball-bearing lubricated plug valve.

The main reason for the change, as explained by Walworth, is to identify the valve without giving a detailed description of it, and thereby making it easier for it to be specified. The valves, which range in size from ½

to 30 in., have been produced by Walworth for the past 25 years.

Rolotork valves, made of carbon steel, or alloy steel only, are used on high-pressure pipelines or on low-pressure lines of large dimensions. The valves are capable of withstanding pressures up to 5,000 psi.

John P. DeHetre is appointed

. . . general sales manager of Youngstown Sheet & Tube Co., succeeding John M. Tuthill, who has retired. The report was made by M. H. Watkins, vice president of sales.

DeHetre has been assistant sales manager since 1954. He joined the company in 1938 as an assistant field engineer in Los Angeles. He was named field engineer in 1944, and in 1947 was transferred to Youngstown, Ohio as a development engineer.

DeHetre became manager of oil-country tubular sales in 1949. In 1954, several months after being made assistant general sales manager, he was assigned to the Chicago district sales office. He returned to the Youngstown general offices in 1958.

Regional offices are set up

. . . by International Harvester Co. in New York City, Melrose Park, Ill., Dallas, and Oakland, announces C. E. (Skip) Jones, engine sales manager of the company's Construction Equipment Division.

Regional engine sales representatives in New York are R. J. Winkler, D. C. Steele, and R. G. Moore. A regional supervisor will be appointed later. A. W. Meyer is the North-Central regional supervisor, locating at Melrose Park, Ill. Sales representatives are J. A. Kathrein, R. K. Langdon, E. H. Hannum, and G. A. Gibson.

L. E. Muzzy is regional supervisor at the Southwest region at Dallas. Representatives are E. C. Price and F. R. Johnson. A western regional supervisor for I-H's Oakland office, will be named shortly. Sales representatives are J. D. Reishus, F. W. Knox, and D. W. Rains.

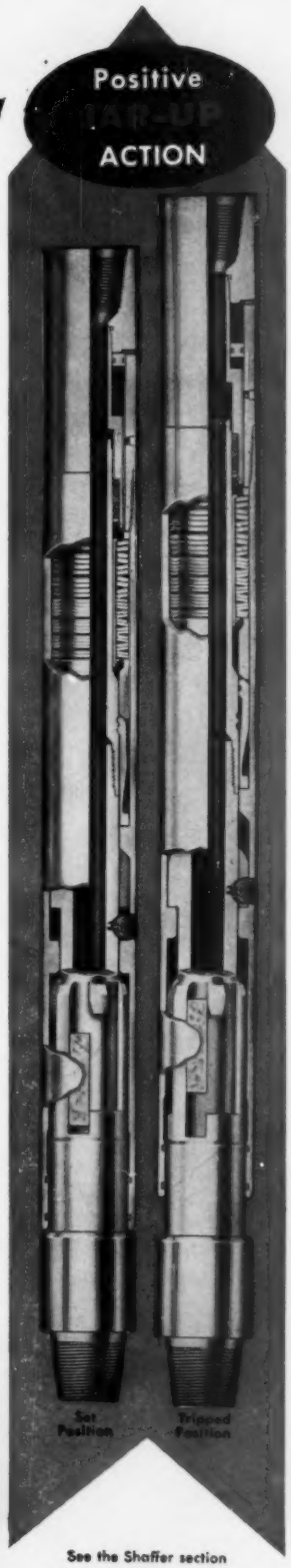
Oil Well Supply assigns two

. . . men to Swans Hill, Canada, announces W. A. Weir, Canadian area manager of U.S. Steel Corp.'s Oil Well Supply Division. A. C. Johnstone takes over as field representative and C. B. Fisher assumes the post of store manager.

Johnstone was employed by Oilwell in April 1954 at Edmonton. Fisher began with the division in August 1952 also at Edmonton.

For fishing, testing and core-drilling strings . . .

. . . plus Safety Joint protection!



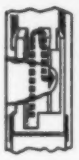
THE SHAFFER OIL-SEALED JAR SAFETY JOINT

The Shaffer Oil-Sealed Jar Safety Joint is the only tool that combines a choice of *jar-up* and *releasing* actions, both under complete control of the operator at all times. What's more, all operating parts are sealed in a chamber filled with clean oil, fully protected against mud, sand and corrosive fluids.

The sealed-in-oil protection not only safeguards against abrasion and corrosion, and minimizes pressure differentials on packing elements, but also insures constant operating characteristics at all depths. This makes the tool ideal for fishing, testing and similar strings where light connections and equipment are used!

Jar-Up Action

JARRING ACTION IS AUTOMATIC—simply raise the drill string until tension equals the pre-set tripping load, whereupon a sharp up blow is struck. Lowering the tool automatically re-sets the tripping mechanism for another blow—and repeated blows can be struck as fast as the string can be raised and lowered.



Releasing Action

ONLY STRAIGHT PULL is necessary to operate the tool—no torque or other secondary operations to affect the light connections commonly used in fishing, testing and coring strings.

TO RELEASE, in the event the fish or stuck string cannot be loosened, simply trip the tool and apply reverse torque as the string is slowly lowered. Only one-sixth turn of the drive keys rotates them into an unlocking slot whereupon raising the string allows the parts to unlock.

AND NOTE THIS—not only does the tool transmit full torque loads in *either* direction, but no threads are used in the releasing mechanism. Therefore there's no risk of torque over-tightening the tool—nor can reverse rotation accidentally release it.

Also, force of the blow is absorbed by integral knocker heads—not by easily damaged drive keys or threads. The tool is designed for *sustained* jarring operations. And since it does not depend upon friction for its tripping action, the Jar Safety Joint always operates with the same pre-set action. Light strings are not subjected to unpredictable loads!

Free 8 page booklet gives many other facts about the Shaffer Oil-Sealed Jar Safety Joint. Write for it—or ask your nearest Shaffer representative.

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

SHAFFER TOOL WORKS Box Signature Co/Alma Service Shops Santa Fe Springs and Fish
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OKLAHOMA CITY, OKLAHOMA Shaffer Tool Works, 6201 South Sunnyside Boulevard
FARMINGTON, NEW MEXICO Shaffer Tool Works, Post Office Box 546
CASPER, WYOMING Shaffer Tool Works, Post Office Box 1708
HOUMA, LOUISIANA Shaffer Tool Works, Post Office Box 827
EXPORT SALES OFFICE Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y. U.S.A.

37 years OF OIL TOOL LEADERSHIP

See the Shaffer section of your Composite Catalog.

WHAT 44 YEARS OF *Leadership* MEAN TO PUMP USERS

"A good example of an oil field pump which sees a great deal of use in this (gathering line and small trunk line) service is the Gaso Figure 1742 2½-5½ x 10."

From the Book
"HYDRAULICS FOR PIPELINERS"
by C. B. Lester

Let's examine the word "Leadership" and what it means to the user of any product.

Leadership is positive proof of **superior performance**. How else would you explain the preference that creates leadership?

Leadership identifies a manufacturer who keeps pace with the changing needs and conditions of his customers, and a product that embodies the latest advances in design and construction. How else can leadership be maintained?

GASO's leadership in its field, stretching over a period of 44 years, is built on a foundation of experience, concentration, research and service, all leading to the kind of performance exacting users look for in pipe line and water flooding operations.

This and this alone explains why Gaso Pumps are a standard specification in the buying policies of so many progressive oil industry companies.

May we send you our latest catalog?

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for every oil industry need

GET GASO DEPENDABILITY IN WATER FLOODING, TOO

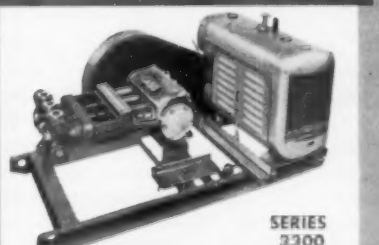
Gaso Pumps in operation at a water flooding pilot plant in Venezuela

The same time-tested characteristics that established Gaso Pumps as leaders in pipe line service have made them the outstanding choice in water flooding service. More service per pound of weight or dollar of cost. Longer life with less maintenance. Rugged compactness. Above all, the assurance of dependable performance, with types and sizes that assure adaptability to the job.

Gaso distributors are qualified by training and experience to help you find the effective answer to any problem associated with water flood service. You will find them listed on the opposite page. Latest catalog on request.

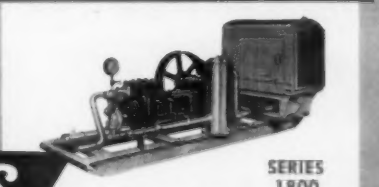
SERIES 3600

Horizontal Triplex Plunger Pumps with 6" stroke and either of two fluid ends. The large capacity fluid end (Fig. 3671) takes 2½" to 3½" plungers and operates with pressures from 1575 to 800 psi. Small fluid end (Fig. 3670) takes 1½" to 2¼" plungers and operates with pressures from 3750 to 1935 psi.



SERIES 3300

2¼" x 3" Horizontal Triplex Plunger Pump designed for rugged, high-pressure service. Extraordinary performance (up to 44 Bbls. per Hr.), time-tested Gaso design features in a pump that weighs only 720 pounds.



SERIES 1800

Fig. 1849 takes 2½" to 4" pistons and operates with pressures from 900 to 350 psi. Fig. 1847 takes 2½" to 4½" pistons and operates with working pressures from 900 to 275 psi.

GASO PUMPS
for every oil industry need

CAREFUL STUDY DICTATES CHOICE OF PUMPS

GUESSWORK AND HUNCHES OUT IN PRESENT-DAY BUYING PRACTICE

Guesswork, hunches, even personal preferences, have no place in the present-day selection of pumps for pipe line, water flooding and other projects.

Today efficiency-conscious management insists on the selection of pumps which, through investigation, prove to measure up in greatest degree to the concept of maximum performance per dollar expended.

These facts were brought out in a study of recent sales by Gaso Pump & Burner Manufacturing Co. Among the yardsticks used to govern pump selection are:

Completeness of line, assuring models and types best suited to specific conditions.

Performance record, embracing a study of service, service life, operating and maintenance costs.

Responsibility of manufacturer.

Follow-Through Service, with special emphasis on the availability and immediate delivery of parts.

For the Gaso company, selection based on investigation is a welcome practice. Any study by prospective customers will reveal a complete line of pumps in the Gaso capacity range, with a 44-year record of dependable, economical performance. Significantly, parts are still available for any standard model ever built by Gaso—with service calls which indicate that many of its earliest models are still in operation.

How a "Wedding Band"...

gives double strength to

AMERICAN IRON

Flash Welded Tool Joints!

An induction coil or "Wedding Band" is a new strengthening process used by American Iron for heat treating their Flash Welded tool joints at the weld line.

The induction coil heats the weld line and the heat affected areas from flash welding, to approximately 1700 degrees in a very short time.

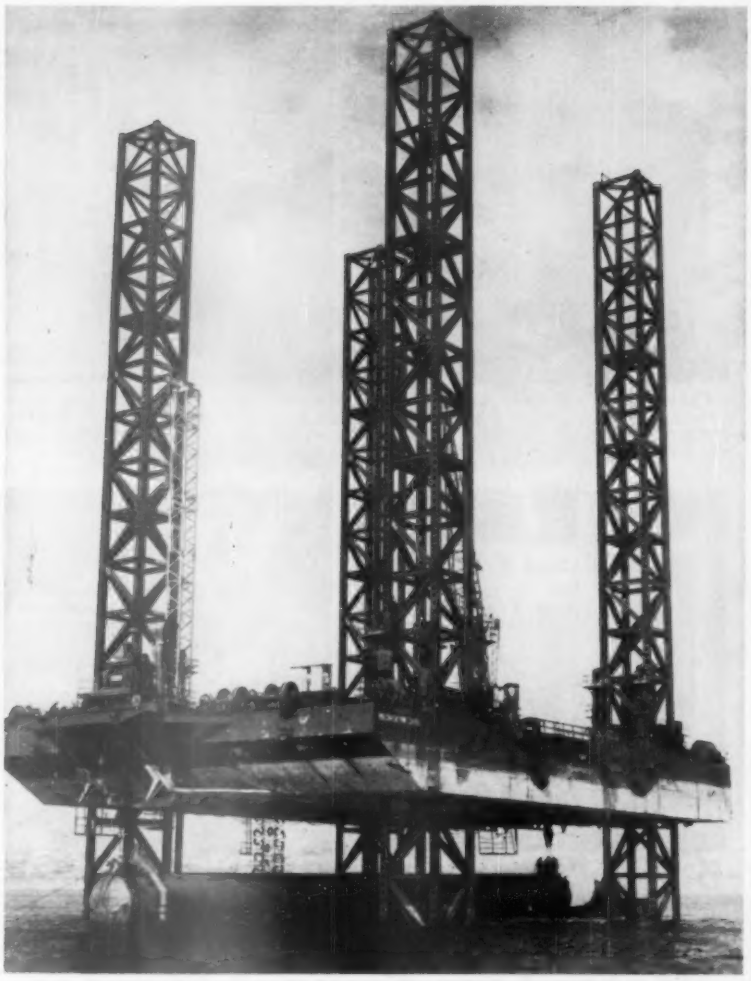
This process improves the physical properties of the material by refining the grain size which has been enlarged during the weld cycle. It causes a "wedding" of the grain structures across the weld interface. There is no longer a weld line . . . but now a ductile, strong weld zone.

The entire heat-treating process more than doubles the tensile-impact strength of the Flash Welded connection. This is just one of the many exacting processes and tests used at American Iron in the manufacture of tool joint-to-pipe connections. Another reason why you buy QUALITY when you specify AMERICAN IRON.

Specify Flash Welded OPEN-HOLE *Tool Joints for your Lightweight Drill Pipe*

AVAILABLE THROUGH YOUR SUPPLY STORE

AMERICAN IRON & MACHINE WORKS CO., INC. · MANUFACTURERS OF OILFIELD EQUIPMENT · A · OKLAHOMA CITY



THIS DEEP-WATER platform is both mobile and efficient.

Barge due for drilling unit

WORLD'S LARGEST mobile platform, the George F. Ferris, has completed the $21 million pipeline-laying job off El Segundo on California's Santa Monica Bay, and is slated for towing to Long Beach where it will probably be converted to a drilling platform.

The huge platform made more than 170 moves during the pipe-laying job and operated in depths to 203 ft. during this time.

It is owned by a six-firm partnership comprised of Raymond International, Inc., The DeLong Corp., Healy Tibbitts Construction Co., Peter Kiewit Sons' Co., Tavares Construction Co., and Macco Corp.

Denver basin program set

A TULSA FIRM, Falcon Seaboard Drilling Co., has announced it will drill between 25 and 40 wells in the Denver basin during the next 10 to 16 months from February 1. The program began last November with successes at Singleton in Nebraska and in the South Adena area of Colorado.

The company will drill farmouts from other operators or will consider quarter and half-interest proposals from firms that will offer them. Previously, Falcon Seaboard has limited its operations almost entirely to 100% ventures. The total number of wells that actually will be drilled will depend upon the quality of the prospects that become available.

An improved discovery ratio in the area is attributed to the company's change in policy and scheduling practices. Further, reserve estimates in the Denver basin have been upgraded through relatively recent activity. Comparatively stable markets and reanalysis of secondary recovery economic factors have had a favorable effect on over-all basin operations.

The firm has 30 active rigs in the United States along with others operating in foreign countries. The proposed program of up to 40 wells will be contracted because Falcon Seaboard has none of its rigs in the basin at present.

Kansas drilling jumps in 1959

KANSAS DRILLING ACTIVITY, as reflected by notices of intention to drill filed with the state conservation division, was up 5% during 1959.

As the year ended, 5,870 notices had been filed. That figure compared with 5,592 in 1958 and 5,971 in 1957. The index showed 1959 activity up 33% over 1958 at the end of April, but by the end of September the lead had been cut to 10%.

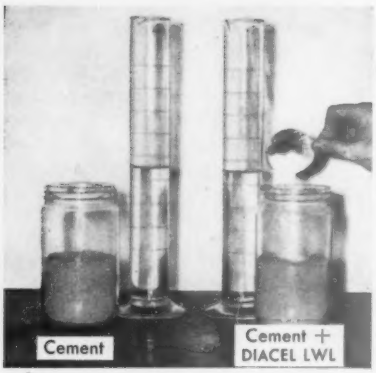
Contractor obtains directional tools

ON SEPTEMBER 3, 1959 Rowan Drilling Co., Fort Worth, became the first drilling contractor—as far as it is known—to have its own directional tools and a full-time specialist to use them.

Jack Liem is that specialist. He earned his bachelor of science degree in petroleum engineering at Texas A&M College in 1949 and then served as a trainee with a Gulf Coast drilling contractor. The years from 1950 to 1959 were spent with a well surveying company where he advanced to the position of directional drilling engineer and manager of the service company's Lafayette, La., district office.

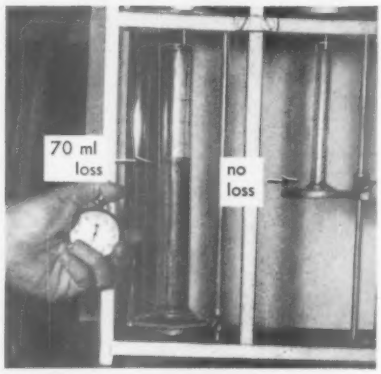
Since joining Rowan, Liem has supervised the drilling of the firm's first directional well and is now engaged in the second venture. He and his family have moved to New Orleans.

SEE the difference that MAKES a difference...

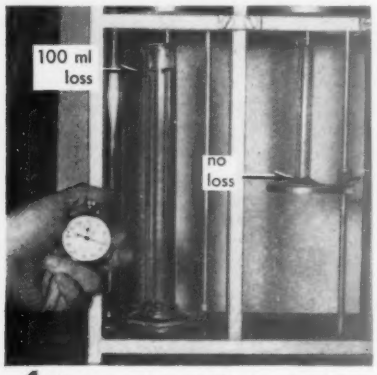


1 Demonstration begins with 2 jars of Portland cement (500 gms each) and 2 graduates of water (275 mls each). 2.5 gms of DIACEL LWL are added to cement at right.

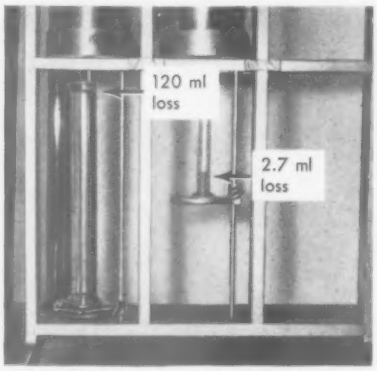
2 After mixing in separate blenders, cement slurries are placed in filter presses. Air pressure of 100 p.s.i. is applied to each. Slurry with DIACEL LWL (½% by weight) is at right.



3 Water pressed from slurries drips into graduates and is measured. After just 35 seconds, slurry in press on left without DIACEL LWL has lost nearly 70 mls of water.



4 After one min. and 17 sec., slurry in the press on right with DIACEL LWL has not yet lost any water. Untreated cement has now lost over 100 mls of water.



5 After 10 min. under 100 p.s.i., cement with DIACEL LWL has lost only 2.7 mls of water (in small graduate). The other cement slurry has lost over 120 mls.

6 Opening filtration chambers shows cement with DIACEL LWL on right still fluid and pumpable. Cement without DIACEL LWL has dehydrated and is unpumpable.

The Best Low Water Loss Cement Slurries Are Made With DIACEL* LWL

The laboratory demonstration above shows how adding a very small amount of DIACEL LWL to cement will provide low water-loss slurries that help prevent sticking, flash setting, and water damage to potential pay zones. The ability of DIACEL LWL to control water loss and thickening time makes it especially beneficial for squeeze jobs and for cementing deep, hot wells.

With versatile DIACEL additives, you can tailor-blend cement slurries that meet practically all conditions. This tailor-blending saves you money in much the same manner as engineering your casing string. It will pay you to get complete details and technical literature on all DIACEL CEMENT SYSTEMS. See your Drilling Specialties field engineer . . . or cement service company.

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TALKING IT OVER . . . L. H. Horn, Chicago, operator; Mrs. Clete Garner, and State Rep. Garner discuss plans for a second well near the recent wildcat gusher completed on the Garner farm by Horn and Allen Borton of Nowata, Okla.

Kentucky merits closer attention from geologists

BY FRANK J. GARDNER

FEW WILDCAT strikes in recent years have created as much excitement as the turn-of-the-year gusher in Clinton County, Kentucky. As the largest well ever finished in the state, it deserved much of the publicity and fanfare it received. But on sober second thought, the industry must regard the discovery as a classic testimonial to its own apathy. And it should remind every geologist that oil can still be found by walking an outcrop.

Surface geology . . . "How did you pick the spot to drill this well?", we asked Allen Borton of Nowata, Okla., thinking he'd say, "Oh, I just waved my arm and said 'right about here'."

But no.

"We drilled on a closed surface structure that we found by walking the outcrops. After all, my partner, L. H. Horn, is a graduate geologist from University of Chicago. As a matter of fact, we had so many spots that looked good, we changed locations three times before we finally spudded."

And spud they did. In the rolling hills of Clinton County, on a farm belonging to State Representative Clete Garner, their first well blew in on January 2 as the bit penetrated the Stones River - Lebanon limestone at 1,012 ft. For a couple of days it defied control, and flowed an estimated 20,500 bbl. in 36 hours; some of the flow was choked off, but oil and gas shot up around the plug to a height of 50 or 60 ft. (OGJ, Jan. 11, 1960, p. 52). Flowing pressure of 800 psi. was estimated.

"We were really looking for the Murfreesboro," Borton says, "but when we met all that pressure, we decided to finish her up there and then."

Borton & Horn et al. 2 Garner is now on the way down at a spot about 660 ft. southwest of the discovery, and the operators hope to reach the Murfreesboro, and possibly the Knox, in this one. Meanwhile, the No. 1 has settled down to a steady 400 to 500 bbl. per day on pump.

CLINTON COUNTY SECTION

Lower Ordovician-Chazy
Stones River Group
Lebanon
Ridley
Pierce
Murfreesboro
Cambro-Ordovician
Knox Group

Produces a record-breaker . . . Prior to this discovery, the largest flow ever recorded in Kentucky was the Wilson-Cooper well, a Wayne County strike made in 1931; it made 10,000 bbl. daily on initial tally, and is now covered by the waters of Lake Cumberland. The site lies 15 miles northeast of the Garner well.

Now we can look for a repetition of the Green County spree in the tier of counties along the Kentucky-Tennessee border. These include Clinton, Wayne, and Cumberland counties in Kentucky, and Fentress, Overton, and Pickett counties in Tennessee. Already, Tennessee drilling activity is surging, as reflected in the monthly completion reports from that state. Some sources are predicting that we'll see 500 rigs at work in this area before the year is out.

Cynics can no longer laugh off this shallow play. Granted it has its lighter side . . . movie comedians, television stars, and even a few ecdysiasts are sponsoring deals. But for the geologist, here's a serious challenge to attack a prolific prospect in depth. The records of the Kentucky Geological Survey provide a wealth of data which could form the base for such a program of exploration. There are some vivid descriptions of long-forgotten oil strikes, including one as early as 1829, 30 years before Drake.

In an 1891 volume published by the KGS, entitled "The Occurrence of Petroleum, Natural Gas, and Asphalt Rock in Western Kentucky," by Edward Orton, that early oil strike is pictured as "the first great flowing fountain of oil ever opened in this country . . . The well giving rise to it was drilled for salt water . . . 300 ft. in depth, but it proved to be possessed of great energy, and it made a remarkable impression upon the country at large. It was, at the time, counted one of the wonders of the new world. The drilling tools were lifted out of the well by the force of the gas, and a column of oil was thrown to the top of the trees."

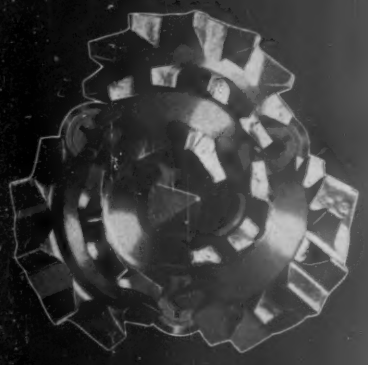
The Borton & Horn well has also made a remarkable impression upon the country at large. The geological profession should be equally impressed.

IN ANY FORMATION WHERE THEY ARE USED

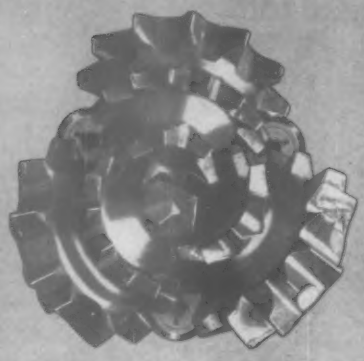
GLOBE 3-CUTTER "TASK-TYPE" ROCK BITS

Stay on the Bottom Longer!

Drillers and Tool Pushers everywhere recognize the superior design and engineering of Globe 3-Cutter "Task-Type" Rock Bits which insure outstanding hole-digging performance.

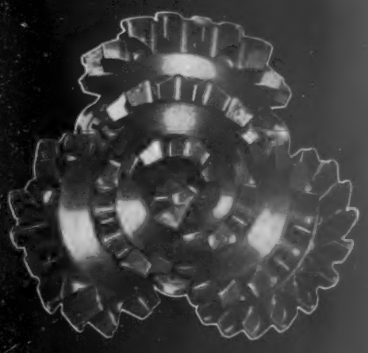


SS3 one of the fastest digging bits for soft, sticky unconsolidated formations.



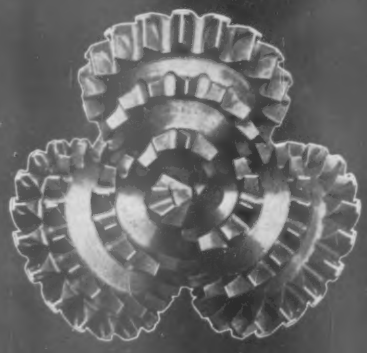
S3 especially suited for digging unconsolidated broken rock and shale with a minimum of "ball up."

MG3 unexcelled for digging soft to medium shale, gypsum and limestone formations interspersed with hard rock.



M3 enginered for fast digging in medium-hard formations.

MHV3 especially recommended for digging and crushing medium-hard chippable formations.



MHT3 exceptionally efficient for digging medium-hard formations. Has extra reinforcing on all gage cutters.

ALL GLOBE 3-Cutter "Task-Type" Rock Bits are available in both regular and jet types.

GLOBE OIL TOOLS

GLOBE OIL TOOLS CO.

Main Office and Plant: LOS NIETOS, CALIFORNIA

Branches maintained in all principal drilling areas

BY KENNETH CHASTEEN

Amarillo

HERE ARE the major geological features of this five-state area.

Discovery of world's largest gas field is prelude to a chain of new strikes for the Panhandle

IT IS IMPOSSIBLE to look forward to 1960 in the five-state Panhandle area without a certain amount of glancing over the shoulder at 1959.

Spread over the Texas Panhandle, northwestern Oklahoma, the Oklahoma Panhandle, southwestern Kansas, southeastern Colorado and northeastern New Mexico, the area has within its boundaries the Palo Duro basin, the Dalhart basin, the Amarillo Mountain uplift, the Hugoton embayment, the Raton basin, the Las Animas arch, and most of the huge Anadarko basin.

Equally well known as the Golden Spread, the Great Plains, or the Caprock, this region long has been one of the major oil and gas producers in the nation. The huge combination of the Texas Panhandle field, the Guymon-Hugoton field and the Hugoton field has kept it prominent. Largely gas, except for the northern edge of the field in the eastern part of the Texas Panhandle portion, the field has spawned a huge network of natural-gas pipelines. More than a half dozen major gathering systems now originate or cross this five-state area.

The 1950's saw a quiet flurry of activity grow with increasing rapidity as operators began to search for deep production in the big basins to take up the slack between existing reserves in the combined Permian producing areas of the Texas Panhandle, the Oklahoma Panhandle and Southwest Kansas. The boom which climaxed in 1959, was unheralded due to many circumstances. The region is of such magnitude that in no specific area was a concentration of rigs or operations large enough to attract attention. Companies operating in the five-state panhandle area were so widely spread that no great amount of interest was centered in a specific city or state. Major companies operated in the great region from offices in Midland, Amarillo, Hobbs, Denver, Pampa, Borger, Oklahoma City, Tulsa, Wichita, Great Bend, Liberal, Garden City, Wichita Falls, and even Omaha.

High exploration rate . . . During 1959, the exploratory-well success ratio for the combined area ranged from month to month at a phenomenal 40 to 60%. This was achieved even though a pair of the great basins in the area, the Palo Duro and the Raton, saw many new tests with no discoveries. This average is made even more significant when compared with the over-all United States wildcat success ratio of 1 in 12.

Deep exploration was the backbone of activity in the area during the past year. The Anadarko basin saw increased activity in its western, northern and northeastern extremes. Shallow developments occurred in three of the states, Kansas, Oklahoma, and Texas, which undoubtedly will force additional attention during 1960.

Inceased drilling costs anticipated . . . Drilling costs to the contractor will continue their gradual increase in the area as fuel, water, etc., continue upward. Water is costly, especially in this region over most of which the average annual rainfall is 20 in. or less. Farmers and ranchers are hesitant to release the "bird in hand,"—the water in their ponds and streams —for the "bird in the bush,"—the oil or gas that **may** be in the ground. These expenses are above and beyond the increase in steel-product prices which surely will be felt before 1960 is over. Aware, but unafraid of these things, drilling contractors and major companies owning their own rigs have developed into specialists on this area. Only these specialized drilling firms are able to maintain a steady profit from contracting in the area due to a stability in price per foot to the operator.

The coming year will see a slight

increase in turnkey drilling jobs especially as the independents move slowly in an attempt to cut drilling costs. Reentry of oil failures will slack off a little after a record amount of success in 1959. Great strides in completion methods and knowledge of the areas will hold the failure list down.

Leases due to expire . . . An enormous amount of leases are due to expire in the area during 1960. This will assure not only an above-normal drilling campaign by the major oil companies, but will provide an increasing amount of farmout opportunities which will entice the independents to the area in ever-increasing numbers.

More pipelines are due . . . Pipe is now being put in the ground for the gathering system of the Trans-Western Natural Gas Pipeline Co. after more than 2 years of planning. The immediate effect of this will be an increase in the drilling of development and edge wells in areas already dedicated to the system as operators prepare for connection. This line will also spur wildcat activity in such counties as Cimarron, Texas, and Beaver in Oklahoma; and Lipscomb, Hemphill, and Roberts in Texas.

Plans for a pipeline of comparatively small size but of almost equal importance to some operators have been announced by Shamrock Oil and Gas Co. of Amarillo. Running from the firm's McKee plant north of Amarillo, the proposed line will terminate in the Ellis Ranch area of southeastern Ochiltree County. This will in turn increase activity not only in Ellis Ranch field, but will quicken the pace of exploration and development south of the line in northern Hutchinson and Roberts counties in the Texas Panhandle. North of the line a majority of the acreage has previously been committed to Trans-Western.

Another element is the proposed LPG pipeline of the Missouri-Kansas and Texas Railroad. Beginning in Eunice, N. M., the line will acquire additional products at Pampa on its trip to McPherson, Kans. From there it will split to serve cities in Iowa and Wisconsin.

New pays found last year . . . Events of 1959 will spur increased activity inside the boundaries of Texas Panhandle and Hugoton fields. In southwestern Kansas, it was found during 1959 that another Permian formation, the Council Grove, was productive in Stevens, Grant, and Kearney counties. Late in the year, the Corporation Commission of Kansas set up Panoma gas area in these three counties to cover an area roughly equal to six square

"Events of 1959 will spur increased activity inside the boundaries of Texas Panhandle and Hugoton fields."

townships. At year's end, less than 24 sections in this huge area were productive from the horizon to leave the way open for development in 1960.

The Oklahoma Panhandle also saw Council Grove production opened in the Guymon-Hugoton part of the old field. Testing was continuing at year's end at the Phillips 1 Reust in south-central Texas County, after gaging as high as 2 M.M.c.f.d. of gas from Council Grove. If completed, this well will spur increased activity and will help bring the little man back to the Panhandle.

Red Cave should provide boom . . . Another incident that occurred in 1959 may prove to be the most important key to a 1960 boom. Red Cave, or Tubb sand, production was reported in Sherman County, Texas. The occurrence touched off interest which revealed that at least five gas producers from this horizon had been drilled and shut in in a widespread portion of northeastern Potter County. Although information was available on these wells, no evaluation of their actual significance occurred because they were never officially completed. Later in 1959, the zone was found productive in southwestern Hutchinson County and in southeastern Moore County. A study of drillers' logs of wells drilled during the early boom days of Texas Panhandle field has revealed to the writer that the zone had shows over a big portion of the old field.

Reliable sources expect at least 30 exploratory tests to the formation during the coming year. Since the sand blankets the old field and grades into a shale as it slopes into the Anadarko basin, it is conceivable that production can be found outside of the old field; 1960 will see at least one Red Cave test on the flanks of Panhandle field. This will probably be on the south side in Potter County and be disguised as a strat test.

This widespread exploration of the Red Cave, if successful, will be the greatest force in increasing shallow drilling in the five-state area during 1960. Farmouts will be more readily available later in 1960 in the large acreage leases now held in the old Texas Panhandle field. Field rules may be set up on the formation no later than midyear. This again will increase drilling.

Southeastern Colorado, long considered favorable by area geologists but never very well explored, will see its greatest year during 1960. Spurred by developments in late 1959, major oil companies will be a little more hesitant to farm out huge acreage blocks in the area and will begin taking a closer look at the region. At least 50 ventures are expected for this portion of Colorado.

Sporadic drilling will continue in the Palo Duro basin of the southern Texas Panhandle as large acreage holders there continue drilling commitments. A Wolfcamp gas show in Oldham County during 1959 will increase activity in the northern part of the basin.

Exploitation to continue . . . Development drilling in the oil portions of Texas Panhandle field will continue at a pace comparable to the past year during 1960. Although well defined, there are many undrilled inside leases remaining in the field; 1960 will also see stepped-up testing of the flanks of the old field. This will be brought on by recent Pennsylvanian-Granite Wash finds in southeastern Hutchinson County.

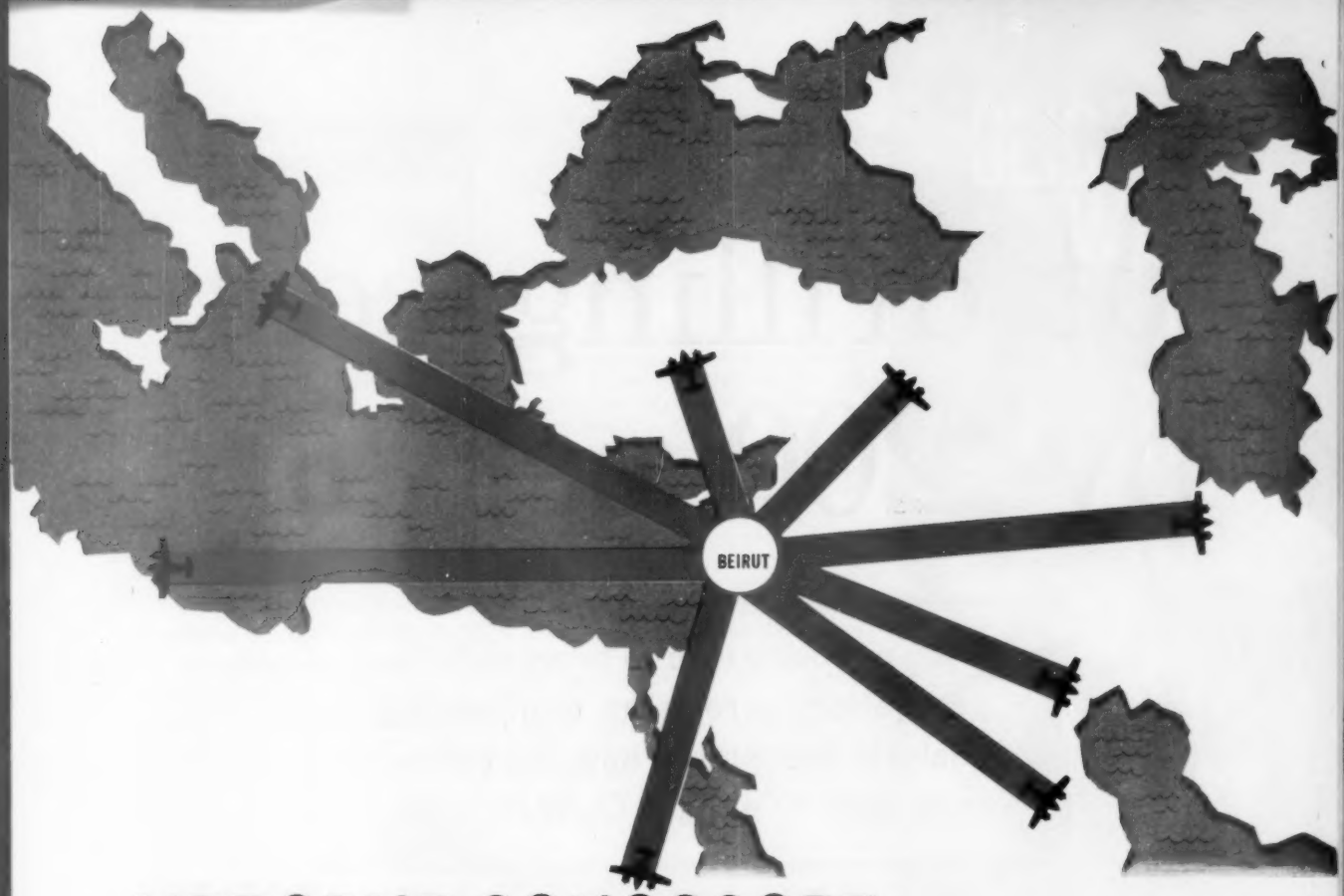
Drilling in the Texas Panhandle portion of the Anadarko basin will see a larger number of exploratory wells cutting deeper into the Mississippian. Events of 1959 which opened the formation to production over a widespread area cannot be overlooked.

Northwest Oklahoma will see increased activity. Oklahoma City and Tulsa offices of the major companies will argue less about district boundaries and get down to earnest exploration in the counties of Beckham, Ellis, Major, Woods, and Woodward.

Beaver, Texas, and Harper counties will see a continuation of the breakneck drilling pace already under way and will in turn spur interest in other parts of Northwest Oklahoma with their high success ratios and multipay completions.

Long a major gas-producing area, Southwest Kansas will join the ranks of the state's leading oil-producing areas during 1960. Extensive deep drilling will center again in Finney, Haskell, Meade, and Morton counties. Such fields as Pleasant Prairie in Finney, Eubank in Haskell, and McKinney in Meade County, along with other fields in the area, will continue development at a steady pace.

Larger budgets have already been announced by many of the major companies for operations in the area. This in itself is the tipoff to increase activity. One example is the announced plan of Stekoll Petroleum Co. of Dallas to continue its brisk program in the re-



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new analysis shows how to-

cut drilling costs by $200 per day

If you are using mud as heavy as 12 lbs. per gallon, here is an engineering analysis that shows how you can cut mud costs by using a CLAYJECTOR®.

12-pound mud generally contains about 1½ sacks of barite per barrel. Every time you jet a barrel of mud, you lose barite as well as the clays you are trying to get rid of. This means a monetary loss of over $3.50 per barrel.

Now, if you use three steel tanks, you lose about 100 barrels of mud every time you jet down one foot. Since it is common practice with muds in the 12-pound range, to jet at least one foot per day, that means you jet away something like $400.00 worth of barite, oil and chemicals. With heavier muds, there will probably be less jetting. However, the greater amount of barite and chemicals per barrel means an even greater loss by jetting. You can avoid that loss if you use the CLAYJECTOR to process your mud — rejecting unwanted clays and retaining expensive barite.

Since you get more than 70 per cent clay rejection efficiency with the CLAYJECTOR, you need process only 140 barrels of mud to reject the equivalent of all the clay from about 100 barrels of mud. This low volume of fluid processed keeps oil and chemical losses at a minimum.

Because barite recovery efficiency is 80 to 90 per cent, you lose less than one fifth of the barite in the mud being processed — a negligible amount out of the whole system.

To summarize, you save over $300 for every 100 barrels of mud you would have jetted — if you use the CLAYJECTOR instead of jetting. *Even when you deduct the cost of the CLAYJECTOR, you still can save well over $200 per day.*

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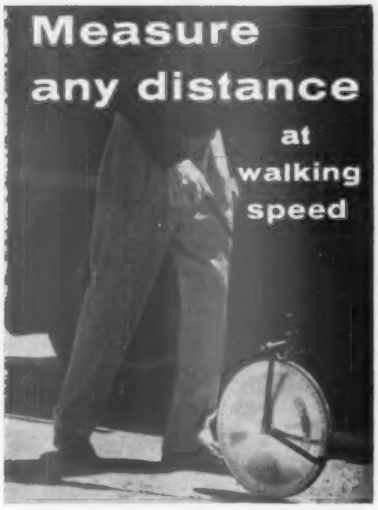

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gion. Though not a major company, the firm spent more than $5,000,000 in the area in the last 6 months of 1959.

Wildcat hits in Texas' Lopena area

Deep Wilcox exploration in the general Lopena area of southern Zapata County, far-south Texas, has paid off again in another wildcat discovery.

This one, by Crescent Petroleum Corp. on a block of approximately 50,000 acres acquired last year from Jonnell Gas Co., is 6 miles north of Lopena gas field proper. It is on a trend, on which a series of deep Wilcox gas-condensate discoveries have been made in the last several years.

Crescent's discovery well, 1 Foss, in the north end of Porcion 23, flowed at the rate of 1,850 M.c.f.d. of gas while testing through ¼-in. choke. Flow was under pressure at 1,250 psi.

Its Wilcox pay is perforated at 8,196-8,215 ft. Hole had been carried to total depth of 10,186 ft. and has casing to 8,686 ft. Several other zones are potentially productive.

South Texas hits deeper pay

A deeper zone than the one in previously completed wells has been found oil productive in the new Person Deep Edwards field opened last year by Brazos Oil & Gas Division of Monsanto Chemical Co. in Karnes County, South Texas.

The new zone is in a southwest outpost well drilled by Shell Oil Co. It is perforated at 10,912-34 ft. in what has been designated as Lower Edwards. The well, 1 Alex Dugie, flowed 181 bbl. of 40°-gravity oil per day with pressure of 625 psi. in tests through 16/64-in. choke.

The upper Edwards, also oil productive in other wells of the field, is 50 to 100 ft. higher.

Remote gas production opens in Kansas' Hamilton

A remote wildcat discovery for western Kansas is Hamilton Brothers, Ltd., 1-16 Tate "A" in NW SE 16-24s-41w, Hamilton County.

The Chase Permian discovery, 15 miles west of Hugoton field proper, flowed 741 M.c.f.d. on 5/64-in. choke from perforations at 2,305-11 and 2,315-20 ft. Location is 5 miles southwest of Syracuse, 8 miles northeast of Helfrich Morrow field and 8 miles from new Gould Morrow oil field.

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Cardium moves south in Alberta

FURTHER Cardium sand success is reported in the Calgary area of southern Alberta. Shell Oil Co. of Canada, Ltd., 6-15 Crossfield on LSD 6, 15-28-2w5, north of the city, recovered 400 ft. of oil and gas-cut mud and 30 ft. light-gravity oil on drill-stem test in the Cardium sand.

The test was at 6,699-6,879 ft. The well is due to proceed to Mississippian at about 8,600 ft. This region in the southern part of Alberta is growing into what could be a major Cardium sand producing area. Cardium production is now established in four separate areas over a distance of 33 miles. The trend stretches from Beddington 4½ miles north of Calgary in a straight line to Westcott pool just southeast of Harmattan-Elkton. Lying in between these two areas are the Shell A13-2 Crossfield Cardium well (the first Cardium oil in southern Alberta) and the Cree-CEGO 6-2 Carstairs Cardium well, and now the new Shell 6-15 Crossfield. The Carstairs wells and the Westcott producers are all making the daily 50-bbl. allowable.

Westcott . . . This field is the busiest Cardium area in the southern part of the province. The discovery well was Canadian Superior Oil of California, Ltd.-Home Oil Co., Ltd., Westcott. Two rigs have been busy since completion of that well. There are now four more producers in the field. Reports state the operators will drill at least 20 wells here.

Carstairs . . . This discovery is being followed up by a planned wildcat 2 miles north of the discovery. The Canadian American Royalite-Penwa Oils, Ltd.-Conick Petroleums, Ltd., team will do the drilling.

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Western Kentucky nets Renault discovery

Lower Renault lime is the pay at a new discovery in Henderson County, 3 miles northwest of Robards in 6-O-24. Wausau Petroleum-Ashland Oil & Refining Co. 1 R. H. Whitledge Community is on pump for tests at 2,438-50 ft. The new-pay discovery swabbed 369 bbl. of oil in 24 hours after acid.

Discovery seen for Bowman North Dakota

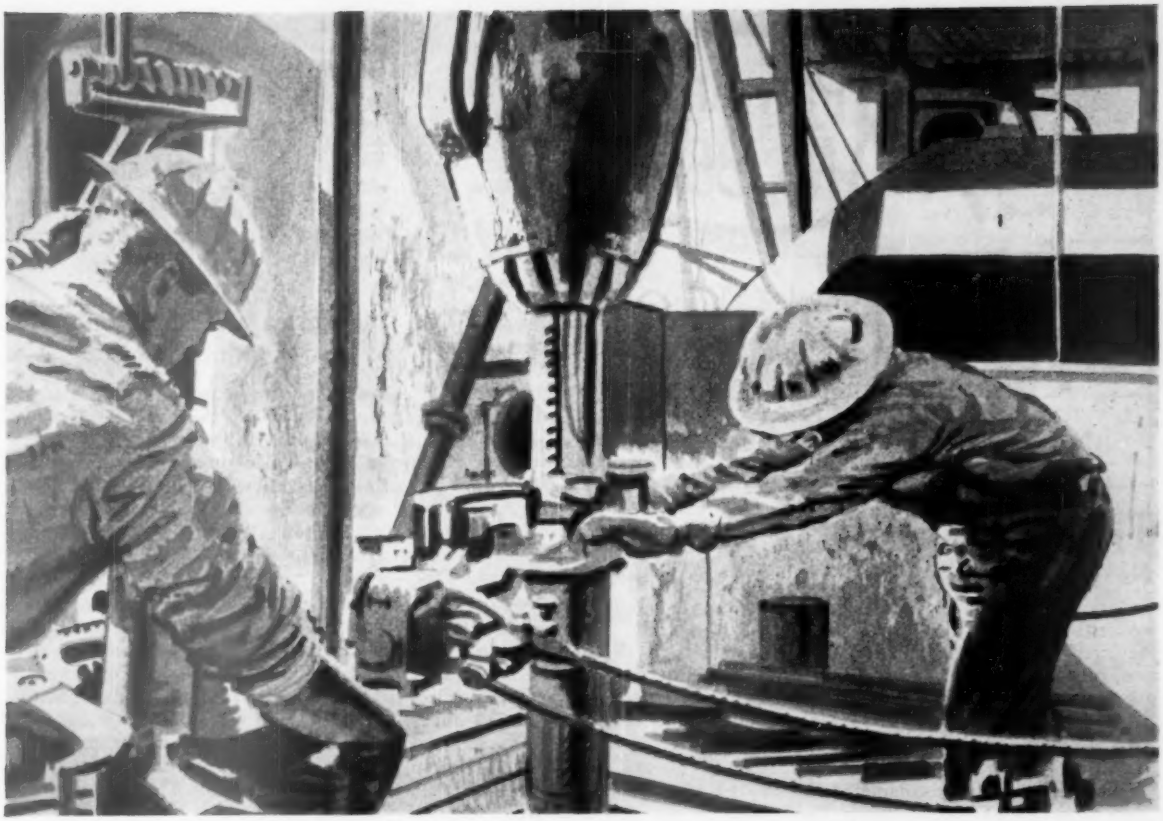
North Dakota's Bowman County in the extreme southwest corner of the state has a new oil find. It is Shell Oil Co. 41-23A Government-Unit in NE NE 23-130n-107w, inside Cedar Creek gas field on the southeast end of the long Cedar Creek anticline.

Shell swabbed 4.3 bbl. of oil and 1.4 bbl. water per hour on 3-hour test of Red River-Ordovician at 8,268-77 ft. It is 3 miles east of Little Beaver field of Montana.

Westernmost Anadarko Hunton production opened

An important Hunton Siluro-Devonian gas discovery is reported in Harper County, northwestern Oklahoma. The well is Statex Petroleum Co. 1 Bennett in NW SE 29-27n-21w, east-central Harper County.

Flow was 3 M.M.c.f.d. and 360 ft. of clean oil on recovery during tests. The test was at 7,135-96 ft. in Hunton. Another test at 7,233-7,305 ft. got up to 2,625 M.c.f.d. and recovery was 10 ft. condensate. This will be the westernmost Hunton production anywhere in Kansas or Oklahoma if successful. Nearest Hunton production is in Major County many miles southeast at Sinclair Oil & Gas Co. 1 Spafford in the Fairview area.



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Marvin Richards, the Tool Pusher on the rig, says TORQMATIC is the reason they're making round trips so fast—drilling 20% faster—why the rig is far easier to run — one reason why they've never had a breakdown since they got the rig.

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ALL KNOWN Dakota tests in the Gallegos Canyon Unit and environs, San Juan County, New Mexico, are shown on this map of the Farmington area.

Trend seen at Pictured Cliffs

AN EXTENSIVE Gallup - Dakota Cretaceous trend lies under northwestern New Mexico's West Kutz Pictured Cliffs area. This observation, made by The Oil News in Albuquerque, is based on the prolific Pan American Petroleum Corp. 85 Gallegos Canyon Unit in 19-28n-12w, San Juan County.

This well was dually completed for more than 18 M.M.c.f.d. from Dakota at 6,092-98 and 6,130-34 ft. From the Gallup the well flowed 6,574 M.c.f.d Location is 6 miles southeast of Farmington and 2¾ miles southeast at West Kutz Dakota oil pool. The nearest Dakota production to the northwest is 3¾ miles away at Tennessee Gas Transmission Co. 8 Callow. That well flowed 5,640 M.c.f.d. from Dakota and 505 bbl. of oil per day from Gallup. Nearest Dakota well to the southeast is 4¼ miles (except for the 1952 original discovery).

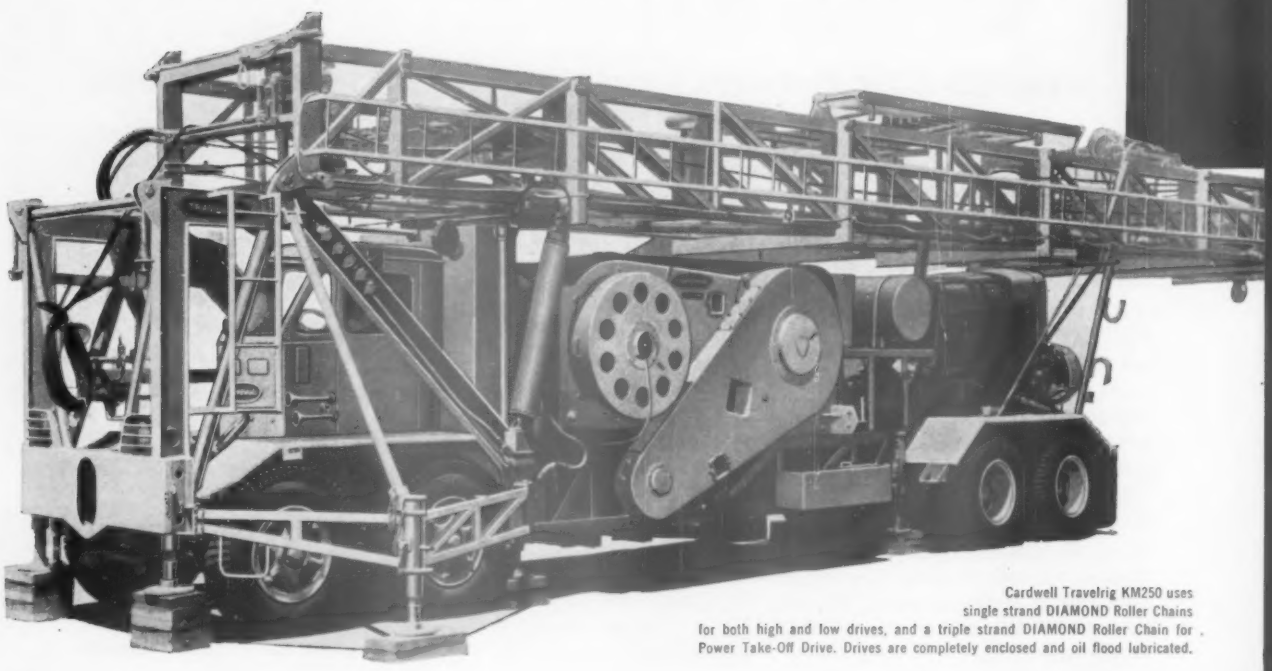
The 83 Unit was completed for 1,250 M.c.f.d from Dakota and 267 bbl. of oil per day from Gallup. This well is still producing top allowable after 1 year. The well to watch now is the 86 Unit, 1¼ miles southeast of Tennessee's well. Completion is nearing at this well.

Nebraska completes one, swabs at another find

In Banner County, Denver basin, Nebraska, B. F. Allison 1 Gross, C SW SW 19-19n-56w, pumped 146 bbl. of oil per day on completion in the "D" sand at 6,062-67 ft. The discovery is ½ mile east of D. J. Pickrell 1-24 Olsen, C SW SE 24-19n-57w, a recent 165-bbl. per day "D" sand discovery.

In the Kan-Neb basin, M. W. Volentine and British-American Oil Producing Co. swabbed 40 bbl. of oil and 2 bbl. water on 3-hour test at the 1 Esch in C NE NE 22-2n-28w, Red Willow County. Apparent discovery is in the Lansing-Kansas City Pennsylvanian at 3,287-3,339 ft. Location is ½ mile southwest of Ackman-Lansing Kansas City field.

for oilwell servicing 3 miles down . . . . . .



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Illinois leads tristate drilling activity

New discoveries in Illinois paced Illinois basin development last week with Franklin, Marion, White, and Coles counties leading the way.

In Franklin . . . John C. Bowers 1 Plains Pipe Line Co., Lease 2, NW SE NW 6-5s-3e, had 1,520 ft. of clean oil on recovery during drill-stem test at 2,785-95 ft. The driller is waiting on cable tools to test the Aux Vases at 2,792-98 ft. This wildcat is 1½ miles from production and 8 miles north of Benton, Ill.

Marion . . . Sohio Petroleum Corp. completed a discovery in Marion County at 1-D Howell Community (Patoka Unit), NEc NW SE NW 28-4n-1e. The Devonian discovery flowed 119 bbl. per day at 2,836 ft.

In White County . . . Ryan Oil Co. 1 L. Price "A" Unit, SW NW SE 29-5s-8e, flowed 100 bbl. of oil in 3 hours, natural, from O'Hara lime at 3,321-28 ft. This well is 3 miles south of Enfield.

Coles County . . . Development Associates had two good wells in a new area 3 miles north of Mattoon. The 1 William H. Tracy "B," NW NE NE 27-13n-7e, the second well, is on pump tests after filling up 1,771 ft. in the Rosiclare sand at 1,918-21 ft. The 1 George W. Miller, SE SW SE 22-13n-7e, the third well drilled, is being tested as a Rosiclare find at 1,902-18 ft.

New gas field opens in Montana's Chouteau

Chouteau County in North Central Montana has a new gas pool. The discovery well is Northern Natural Gas Producing Co. 1-C Federal in SW NE 8-25n-17w.

The well was completed for 2,520 M.c.f.d. from Eagle perforations at 1,698-1,706 ft. The Upper Cretaceous shut-in gas discovery is 1 mile north of Sherard gas field.

Custer County . . . Another gas discovery for Montana, this one completed last fall, is Thomas F. Wheatley et al. 1 Government-Custer in SE SE 34-2n-45e. The well made 1,300 M.c.f.d. from Shannon perforations at 2,806-16 ft. Flow was from the Upper Cretaceous, also. Location is 24 miles northwest of closest production at Pumpkin Creek field in Powder River County.

Knox Cambro Ordovician hit stirs Michigan basin

Perry Fulk 1 Zaremba, SE SE NE 28-4s-3w, midway wildcat about 2 miles from Trenton-Black River zone producing wells in Scipio to the south and Pulaski to the north, swabbed 36 bbl. oil net after 500-gal. acid treatment. Hole carried 1,500 ft. after 12-hour shutdown after swab test.

Zaremba, a farmout from Smith Petroleum Co., excited the industry late in December when drill-stem at 4,338-56 ft. showed oil and gas from a zone below the base of the Black River.

Michigan has first new-field prospect

First 1960 pool prospect, Bell & Gault Drilling Co. 1 Pritchard, C SW SW 11-1s-3w, Jackson County, Michigan, logged Trenton at 4,563 ft. and carried gas in dolomite at 4,624-31 ft. Gas through open hole from 3,760 ft. on cable-tool rig was estimated up to 75 M.c.f.d.

Drilling was halted at 4,631 ft. to set 5-in. liner to bottom hole, as precautionary measure. The gas pay overlay has been typical in all of the oil pools so far developed in southern

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Michigan. However, the gas was found higher in the zone than normal for developed fields.

The wildcat, a Humble-supported play, immediately stirred extensive lease and royalty dealing as operators sensed a new strike. The test is located 10 miles north and 6 miles east of Albion, the present northwest end of the oil play.

Extension completed at Ohio's Fallsbury pool

In Ohio, George M. Gernhardt announces the completion of his 2 Cullison in Section 7, Fallsbury pool, Fallsbury Township, Licking County.

The well drilled Clinton sand from 2,901-39 ft. It then flowed and pumped 100 bbl. of oil and 90 M.c.f.d. on an 11-hour test 7 days after fracture through perforations at 2,914-19 and 2,934-39 ft. Rock pressure was 825 psi. This is the second and best well in the area. It is a ½-mile stepout and field-extension well.

New pool indicated in Ohio play

In Ohio, William H. Patten reports indications of a new pool on completion of 1 Arthur Flory, Section 34, Milton Township, Wayne County.

The test, about 3 miles northeast of Smithville, found the Clinton sand at 3,476-3,531 ft. Natural gage before fracture was 28 M.c.f.d. with a showing of oil and after fracture 1,200 M.c.f.d. of gas and 25 bbl. of oil.

Logs running at new Pennsylvanian field

The first apparent Minnelusa Pennslyvanian oil-field opener for Wyoming's Powder River basin is True Oil Co. et al. 1 Wolff-D, C SE NE 35-49n-71w, 4½ miles southwest of Timber Creek field in Campbell County.

Total depth is 10,016 ft. Operator is running logs. Oil was recovered on drill-stem test between 9,850 and 9,997 ft.

Almond gas discovery looms in Green River

New Almond Mesaverde Cretaceous gas production is indicated at a Sweetwater County wildcat in southwestern Wyoming. The strike is Davis Oil Co. 1 Federal-A, SW SW 12-21n-100w, 7½ miles northwest of Rock Springs Grazing Association, a Texas full string of oil was reversed out, National Petroleum Co. discovery of 1959.

Gas flowed on drill-stem test of the Almond at 3,834-50 ft. at the rate of 268 M.c.f.d. Davis is running pipe. The Texas National well at 1 UPRR-Rock Springs Grazing Association to the southeast flowed 9,200 M.c.f.d. Davis' new prospect is 9½ miles northwest of West Desert Springs oil field.

Deep Texas test is multipay extension well

The southern end of Fullerton field in western Andrews County, West Texas, was assured of Ellenburger production, and had prospects of additional pays up the hole.

Pan American Petroleum Corp. 5-JJ University, is 12 miles west of Andrews, in Section 44, Block 13, University Lands Survey. It is surrounded by Permian produtcion in South Fullerton field, and about 1½ miles south of Ellenburger and Devonian production.

Ellenburger oil was assured on a drill-stem test from 10,920-70 ft. When the testing tool was opened gas surfaced immediately, and oil in 22 minutes. It flowed 150 bbl. of oil during the remainder of the 2½-hour test. A

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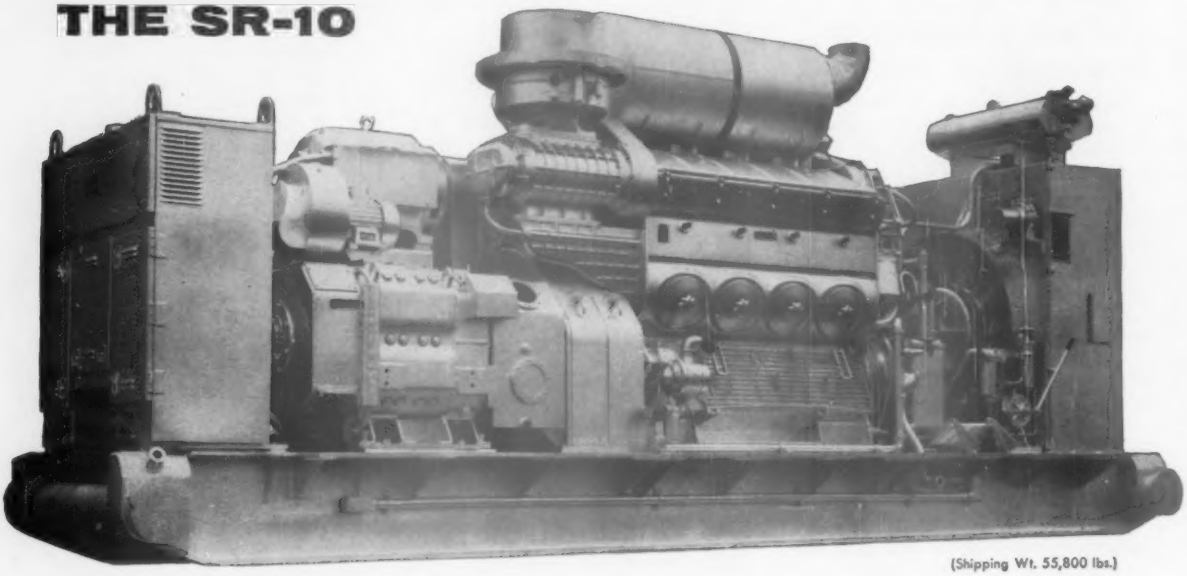

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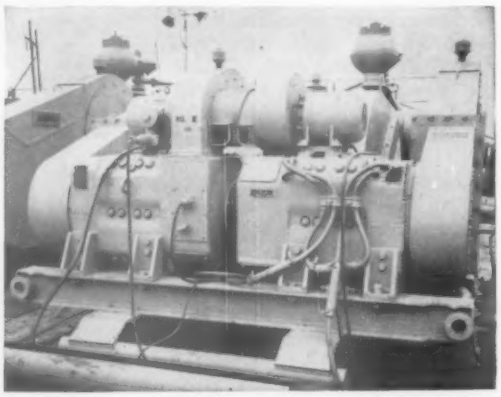
The SR-10 is the newest Electro-Motive deep well power unit. It is the first standardized, completely self-sufficient power system. An integral AC generator eliminates need of outside AC power for blowers, excitation and control equipment. The 1000 hp 8-cylinder Diesel engine drives two generators that produce 640-KW each. Models are available for Dual-fuel operation.

Sensitive, accurate control

Controls for the SR-10 combine the "feel of steam" with the instantaneous response and accuracy of electric drive. Compact, centralized panel gives the driller supervision of all Diesel-electric equipment including safety shutdown.



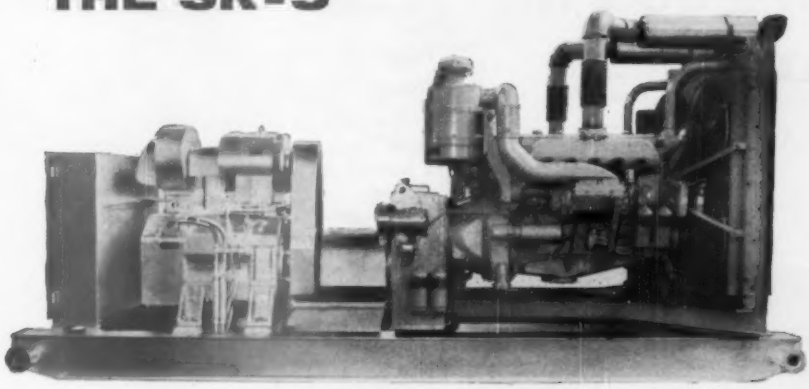
Flexible, positive power

Drive motors for the SR-10 deliver up to 800 hp. The D-49 motor provides smooth and rapid acceleration of loads with positive control of speed and torque. Both drive motors and generators are identical except for field windings, a factor that reduces service costs.

POWER

—*for medium depth drilling*

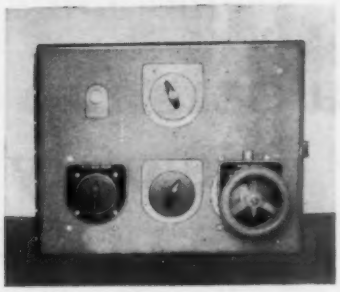
THE SR-5



Simple, economical, adaptable

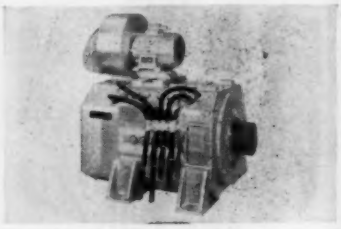
The SR-5 was specifically designed to meet the needs of medium depth drilling. It combines extreme simplicity of design in a compact, portable assembly that saves hours and dollars on rig-up, tear-down and moving operations. Though new in concept, the SR-5 contains the tested dependability, low operating and maintenance features of Electro-Motive SR-10 equipment.

The Basic SR-5 set is a two generator, two drive-motor arrangement. By combining units, drilling power can be tailored to the job for the most economical power arrangement. Skid unit is pictured with a Detroit Diesel engine, though any engine (gas or Diesel) of comparable power may be used.



Driller's Control

Simple control panel of SR-5 requires no special training or electrical knowledge. Sensitivity of controls permit driller to maintain a high drilling rate with complete accuracy and balance.



D-49 drive motor

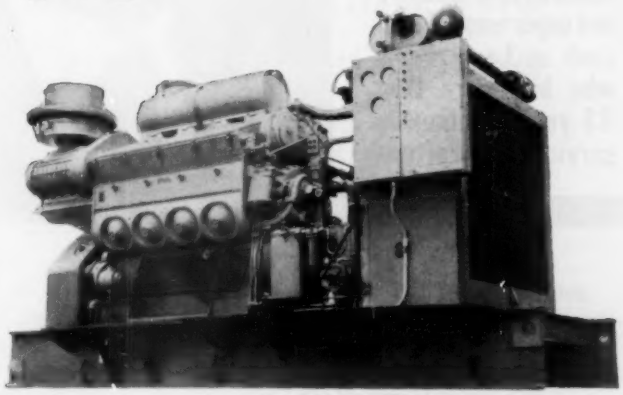
The SR-5 utilizes standard and tested motor components. Electro-Motive drive motors are perhaps the most widely used electric motors for drilling applications. Their dependability and torque characteristics offer speed and power flexibility to meet all drive requirements.

—*for dependable pumping*

THE SK-10

For large capacity pumping operations, the Electro-Motive SK-10 provides a compact and portable skid unit, complete with cooling system and engine controls. The seasoned 567 engine is well suited to the torque and horsepower requirements of pumping applications. The engine is balanced to eliminate any vibration between the set and accessories.

The dependability, low maintenance and economical fuel characteristics of the SK-10's engine have been inherited from General Motors' more than twenty-seven years of Diesel engine manufacture. SK-10 units are available for Dual-fuel operation and heat exchanger cooling.



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with no water. Flowing pressure reached 3,870 psi.; shut-in pressure was 3,910 psi.

Additional pay prospects were in the lower Wolfcamp at 8,157-8,200 ft., and in the Devonian at 8,786-8,859 ft. The Devonian section flowed 27 bbl. of oil in 2 hours. A drill-stem test in the Waddell (Simpson) at 10,880-10,919 ft. recovered 2,322 ft. of oil.

Further tests are scheduled in the Ellenburger.

Pecos County wildcat flows 160 bbl. in 4 hours

A wildcat in eastern Pecos County, West Texas, flowed 160 bbl. of oil in 4 hours from an unidentified Permian section.

The new prospect is one of two 8,000-ft. tests being drilled by Phil H. Hayes as 1 University and 1-A University Lands, approximately 14 miles west of Iraan, and 2 miles west of Grayburg production in Walker field.

The 1-A University ran a drill-stem test at 5,600-5,900 ft. Gas surfaced in 2 minutes and oil in 35. It then flowed 160 bbl. of 26.5° oil in 4 hours and 25 minutes. A later test at 6,351-6,401 ft. recovered slightly oil-cut mud.

No. 1-A University is in the SE SE of Section 9, Block 16, University Lands Survey. The same operator's 1 University, in NW SW of Section 11 had drilling under way.

Panhandle gains new Cleveland oil pool

An old well worked over turned into a Cleveland Pennsylvanian oil discovery for Ochiltree County in the Texas Panhandle. The discovery well is Stekoll Petroleum Co. 1-123 A. McGarraugh, Section 123, Block 13, T&NO Survey.

The south-central Ochiltree oil find flowed 162 bbl. oil per day from perforations at 7,021-37 ft. Location is 14 miles southeast of the town of Farnsworth and 5 miles southeast of Horizon Cleveland pool and 2 miles north of Lips field.

West Texas county gains second oil field

Menard County in West Texas gained its second oil-producing area with completion of a Strawn sand discovery in the northwest corner of the county. The new well is 20 miles northwest of the town of Menard, and 10 miles east-northeast of the F&H (Cisco) field which is in both Menard County and Schleicher County to the west.

J. R. McLean 1 Alex Menzies, the

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This survey, over previously unmapped, unphotographed terrain, could not have been completed, say Aero geophysicists, without the aid of RADAN® Doppler guidance—the newest navigational aid for airborne exploration.

Other air magnetic surveys for major oil companies are being conducted by Aero crews in Venezuela, Italy, Turkey and Australia, according to Aero's technical staff. At home, Aero is engaged in a joint survey in the Appalachian Basin.

Aero's DC-3 at advance base for 40,000 mile Doppler-guided survey.

Still other Aero crews are sighting in on mineral targets in Korea and Thailand, using Piper Apaches for excellent, low-cost "work horse" coverage. In the Middle East, Aero's available aircraft includes the B-17, which has photographed over one million square miles from altitudes of 30,000 ft.

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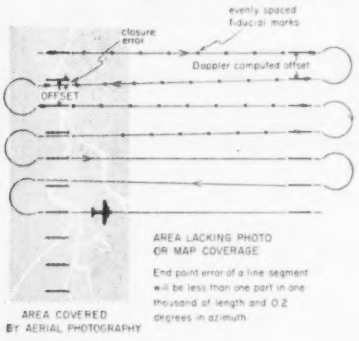
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Menard discovery, has been completed for 122.96 bbl. of 36° oil a day, plus 5% water. The gage was through 16/64-in. choke on perforations at 3,198-3,204 ft. The section had been acidized with 250 gal. of regular acid and fractured with 10,000 gal. Top of pay was 3,197 ft. on elevation of 2,275 ft. Location is in the John Hughes Survey 60.

The F&H field, opened in Schleicher County, has five producers across the line in Menard County.

Gas-distillate well completed in Gulf field

A successful gas-distillate well has been completed on David C. Bintliff's 4,500-acre Bar X Ranch near Angleton in Brazoria County, Texas Gulf Coast.

San Jacinto Oil & Gas Co. - D. C. Bintliff 1 Bintliff flowed through 12/64 in. choke at a potential daily rate of 1,500 M.c.f. of gas. It was estimated the gas would produce 20 bbl. of condensate per day.

Production is from perforations in the McCarthy sand at 10,848-58 ft. There are two lower high-pressure gas zones plugged back for later completion in the 15,730-ft. hole. Shows of oil were found above the McCarthy.

Shut-in pressures were 3,674 psi. at the bottom and 3,050 psi. on the tubing. Flowing tubing pressure was 1,950 psi.

The wildcat is ¾ mile from nearest production in Bailey's Prairie field.

Another operator scores at Beverly Hills

Allen Guiberson, operator, confirmed reports that his Beverly Hills High School test adjoining the 20th Century Fox movie lot in Lot Angeles County was completed successfully. The Guiberson well is considered a northeasterly offset to Universal Consolidated Oil Co.'s production on the film lot proper.

Initial production from Guiberson's test, 1 Beverly Hills High School, was 360 bbl. daily of clean 26.8°-gravity crude through a ½-in. choke from perforations at 5,247-86 ft., 5,356-5,440 ft., and 5,527-48 ft. The perforations fail to shed light on what formation is involved which corresponds with the formations in Universal Consolidated's activity.

In addition to offsetting Universal Consolidated's production, the Guiberson well is also only about ½ mile north of the Signal Oil and Gas Co.-Richfield Oil Corp. activity on the Rancho and Hillcrest golf courses.

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Belgian Anticline extends in California

Production in the Belgian Anticline field in Kern County was extended almost ½ mile northwest of the Main area by a Shell Oil Co. test in SW SW 14-30s-21e. The Shell well, 28-14 PML, found 474 bbl. daily production in an interval at 5,670-80 ft. The crude tested at 33.7° gravity and production was through a 14/64-in. choke. Although no geological information was released by the operator, the perfs. correspond with the Miocene Oceanic zone of the northwest subdivision of the Main area. Total depth of the well was 6,080 ft.

New gas field found in Colusa County, California

A new gas field located about 10 miles northeast of the Arbuckle field and 6 miles southeast of the Moon Bend field in Colusa County was reported. Cameron Oil Co. completed the discovery well after earlier testing indicated it was probably a 4 M.M.c.f. daily well. No completion figures were available. Total depth of the discovery is 7,258 ft.

Texas' Lavaca gets gas-condensate find

A RICH gas-condensate discovery, more than 3 miles from nearest comparable production, has been made by Shell Oil Co. in southern Lavaca County, in Texas' central coastal region.

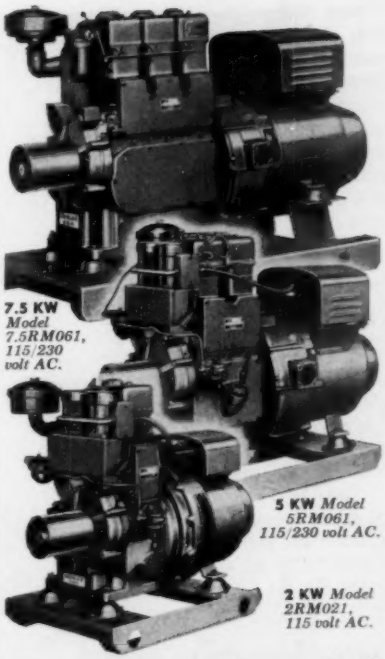
Production is from deep Wilcox sands below 9,500 ft. Discovery well, 1 William Borchers, is completed in two zones. The upper zone, perforated at 9,510-44 ft., has a calculated open-flow potential of 62 M.M.c.f.d. Its 60°-gravity condensate yield is in the ratio of 22,504 cu. ft. per barrel.

Calculated open-flow potential of the lower zone, perforated in three intervals at 9,984-94 ft., 10,004-11 ft., and 10,015-28 ft., is 3,800 M.c.f.d. Gas-liquid (52.6°-gravity condensate) is 41,300 cu. ft. per barrel.

The well was drilled to 11,614 ft. Wilcox formation was topped at 8,420 ft.

There is a shallow-sand gas discovery-well a mile south. This was completed last July by Sun Oil Co. with pays at 2,845-48 ft. and 3,954-57 ft., but nearest Wilcox production is in Southwest Speaks field, more than 3 miles northeast.

The discovery is near the Jackson County line. It is 6 miles nothwest of Morales, in that county.



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New Wilcox gas-condensate production also is being opened in another wildcat a mile northeast of nearest well in Southwest Speaks field. There, North Central Oil Corp. is completing its 1 Robertson with a calculated open-flow potential of 19 M.M.c.f.d. from pay at 8,658-68 ft. Its condensate (51°) yield is in the ratio of 46.6 M.c.f. per barrel.

Second gas zone added to Harper County well

The Morrow Pennsylvanian is an additional pay at a Chester Mississippian well in northwestern Oklahoma's Laverne district. The well is Sinclair Oil & Gas Co. 1 Gibson Unit in C SW NE 21-26n-24w, Harper County.

The Morrow flow was 3,686 M.c.f.d. from 7,017-30 ft.; from the Chester the flow was 5,592 M.c.f.d. at 7,091-7,135 ft. and 6,640 M.c.f.d. at 7,152-62 ft.

Second producer added to Noble County strike

The second well in a new field in northern Oklahoma's Noble County is Porter Producing Co. 2 Reed, SE SE NW 23-21n-3e. The well flowed 8 bbl. of oil per hour from Red Fork sand. The discovery well, 1 Reed, flowed 120 bbl. per day from Red Fork. North White Hall is the field's designation.

New well added to Southwest Byron field

The west side of Oklahoma's Southwest Byron field in Alfalfa County was extended by Continental Oil Co.

The 5 Talley, C NW NE 25-28n-11w, tested 1 ft. of Red Fork Pennsylvanian sand through perforations at 4,986 ft. Flow was 37 bbl. load oil and 76 bbl. new oil in 8 hours on 14/64-in. choke. On final test, the flow was 59 bbl. in 4 hours on 14/64-in. choke.

South-Central Oklahoma discovery completed

The Criner-Payne area of McClain County in south-central Oklahoma has a dual completion. It is Gulf Oil Corp.'s 1-B Carroll in SE NW 28-6n-3w. The well flowed 340 bbl. of oil from Hunton Siluro-Devonian at 8,812-30 ft. in 21 hours through 23/64-in. choke. From Bromide Ordovician at 9,790-98 and 9,750-57 ft. it flowed 500 bbl. daily on 12/64-in. choke.

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Clarke Lake extended in northeastern B. C.

In Canada, Western Natural Gas Co. announces the completion of its 5-X Clarke Lake gas well in northeastern British Columbia. This well encountered 314 ft. of highly porous continuous dolomite above water in the Middle Devonian formation and has been completed with an absolute open-flow potential of 70 M.M.c.f.d.

This is an important completion in this remote area since it extends the field 1½ miles north of the discovery well. The discovery well encountered 82 ft. of continuous porous dolomite and the No. 2 well, an extension northwest, encountered 170 ft. of continuous porous dolomite. Additional drilling is now being conducted on an extension approximately 5 miles west of the discovery well.

These wells are located on British Columbia Petroleum and Natural Gas Permit 195 covering over 250,000 acres and situated approximately 10 miles east of the town of Fort Nelson, British Columbia.

Denton County reentry flows Simpson gas

Recompletion of a wildcat in western Denton County, North Texas, has resulted in a small gas discovery in the Simpson.

Jack Grace Production Co. 1 Rupert Carrol was originally completed dry at 8,870 ft. Workover operations included perforations at 8,161-8,220 ft. and acid treatment with 5,500 gal., which produced a gas flow of 548 M.c.f.d. on ½-in. choke. The well then was shut in for potential test.

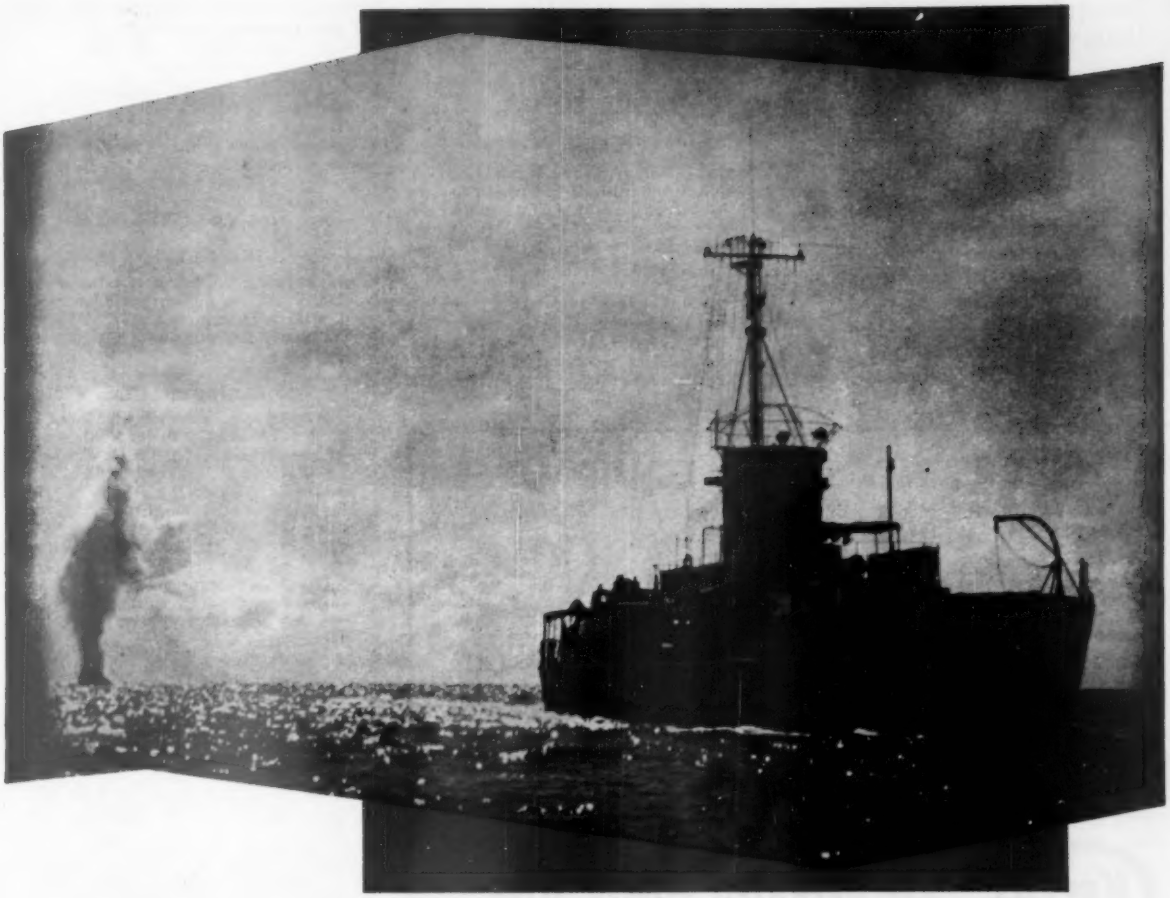
Location is 14 miles west of Denton and 13 miles south of Bolivar field, nearest production. The well is on an 80-acre lease in the P. O'Leary Survey, A-975.

East Texas gas discovery completed

A Woodbine gas discovery has been completed in Leon County, East Texas, and operators have asked for new-field designation of Northeast Buffalo.

The opener is H. H. Holland and Associates 1 Mrs. Allie Bain, located 12 miles northeast of Centerville townsite and northeast of present production in Buffalo field, in James M. Webb Survey.

Calculated open-flow potential was 18 M.M.c.f.d. of gas, plus 49° condensate at the ratio of 250,000:1, from perforations at 5,401-10 ft. Shut-in tubing pressure was 1,791 psi.



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Texas discovery offset flows oil

A second well in Taylor County's new reef pool 30 miles southwest of Abilene reported oil recovery on drill-stem tests.

Jake L. Hamon 1 Lail Estate recovered 1,340 ft. of oil on its initial test of the Cisco reef at 3,609-21 ft., then cored additional pay to 3,631 ft. A test at 3,619-31 ft. recovered 1,530 ft. of oil. Operators then planned to drill ahead to test the Fry sand.

No. 1 Lail is a south offset to Jake Hamon 1-A Lail, now in the process of completion as a Cisco reef discovery.

Discovery wells

ARKANSAS

Johnson County: Arkansas Western Gas Co. 1 Rufus Bartlett, 3-9n-25w. Open flow (calculated) 23 M.M.c.f.d., shut-in TP 1,295 psi., perf. 3,576-3,601 ft., Atoka-Sells sand. TD 4,763 ft. New pay and extension Coal Hill field.

WESTERN CANADA

Alberta: Ambassador-Cities Service 10-11 West Gilby, LSD 10, 11-41-4w5. Mississippian oil discovery. TD 7,240 ft. North Canadian Oils 10-26 Three H. Creek, LSD 10, 26-35-26w4. Mississippian gas discovery. TD 5,940 ft.

COLORADO

Garfield County: Bush Drilling Co. 1 Bowman, NW NW lot 4, 3-5s-92w. IPP 18 BOPD, Weber Pennsylvanian discovery, new field. TD 1,087 ft.

Kiowa County: J. M. Huber Corp. 1 Stubbs, C NW NW 15-19s-45w. IPP 65 BOPD, Lansing-Kansas City discovery, new field. TD 4,690 ft.

KENTULCKY

Clinton County: Allen Borton-Lewis H. Horne 1 Clete L. Garner. Shut in oil discovery. Flowed estimated 20,000 bbl. oil in 36 hours while wild. TD 1,012 ft. 1,012 ft.

NORTH LOUISIANA

Concordia Parish: Sam E. Broadhead 1 Regina T. Burley, 1-5n-7e, 1 mile south of Monterey. IPP 33 BOPD, 43° perf. 5,800½-05½ ft., Wilcox. TD 6,015 ft. New-field discovery.

Union Parish: Carter Oil Co. and J. M. Jones 1 Eva Bolinger et al., NE SW NE. IP 144 BCPD, 1,790 M.c.f.d., 13/64-in., 59°, TP 2,399 psi., perf. 8,950-88 ft., Cotton Valley-Upper Taylor, and 168 BCPD, 637 M.c.f.d., 12/64-in., 58°, TP 1,367 psi., perf. 9,080-9,142 ft., Cotton Valley-Lower Taylor. TD 11,704 ft. New pays in Bernice field.

SOUTH LOUISIANA

Pointe Coupee Parish: Discovery Oil & Gas Corp. 1-A Rowena Buffington, 94-7s-9e, 5 miles south of Fordoche field. IP 216 BOPD, 8/64-in., 41.7°, GOR 1,388 cu. ft. per barrel, TP 2,175 psi., perf. 9,192-95 ft. TD 9,300 ft. New field.

St. Martin Parish: The Grande Corp. 2 A. Wilbert & Sons, 12-9s-8e. IP 67 BOPD, 3 M.M.c.f.d., 14/64-in., 39.8°, GOR 2,500 cu. ft. per barrel, TP 3,800 psi., perf. 12,126-64 ft., and 312 BOPD, 180 M.c.f.d., 10/64-in., 27.3°, TP 1,600 psi., GOR 575 cu. ft. per barrel, perf. 11,606-16 ft. TD 13,455 ft. New-reservoir discoveries in Bayou Bouillon area.

Terrebonne Parish: The California Co. and Southern Natural Gas Co. 1 M. S. Nelson, 2-21s-12e. IP 3,900 M.c.f.d., dry gas, 180 BWPD, 32/64-in., TP 2,100 psi., perf. 13,226-38 ft. 13,251-60 ft. TD 16,018 ft. Extension and new pay in Mosquito Bay field.

Vermilion Parish: Texaco Inc., 1 Edier Bares, 34-11s-4e. IP 34 BOPD, 2,679 M.c.f.d., 7/64-in., 46.4°, TP 10,250 psi., perf. 14,810-18 ft. TD 15,638 ft. New pay in Parcperdue field.

LOUISIANA OFFSHORE

Eugene Island Area: Pan American Petroleum Corp. 1 OCS-0572, Blk. 193, Eugene Island Area, Gulf of Mexico. IP 2,800 M.c.f.d., 24 BOPD, 12/64-in., 59.6°, TP 4,100 psi., perf. 12,168-80 ft. TD 15,837 ft. New field.

NEBRASKA

Cheyenne County: W. C. McBride et al. 1 Richards, C NW NE 32-17n-51w. IPP 180 BOPD, "J" sand discovery, new field. TD 5,310 ft.

Kimball County: Nebraska Drillers 1 Russell, C NW NW 13-16n-58w. IPP 225 BOPD, "J" sand discovery, new field. TD 7-175 ft.

Morrill County: Banner Oil Co. et, al. 1 State, C SE SE 16-18n-50w. IPP 35 BOPD "J" sand discovery, new field. TD 4,320 ft.

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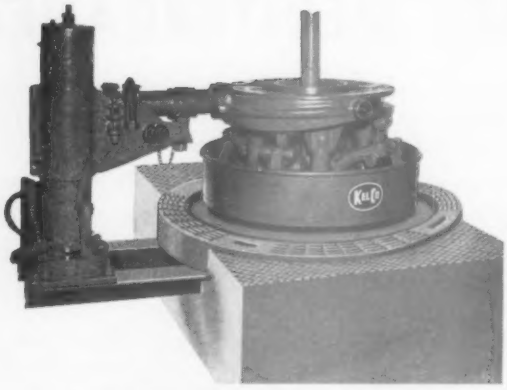

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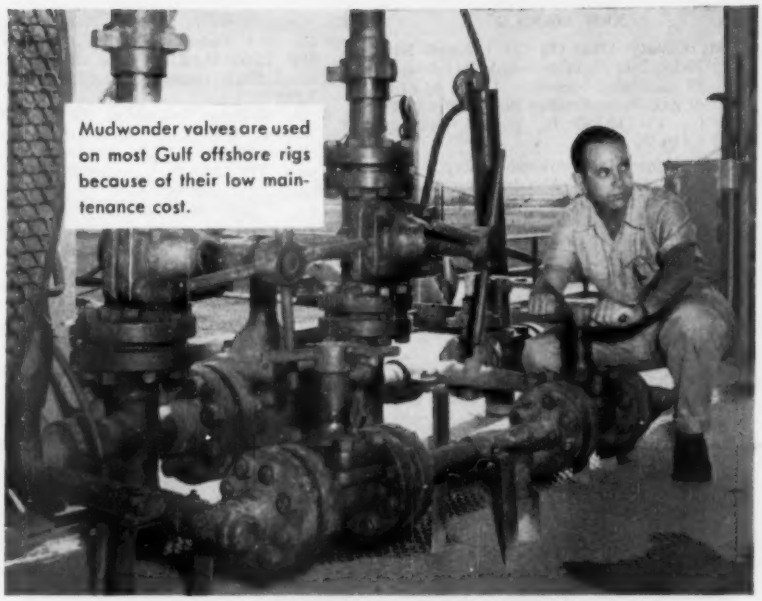

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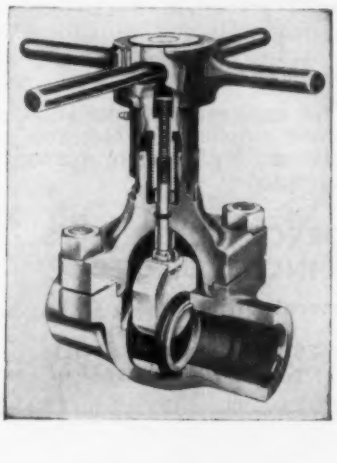

NEW MEXICO

Eddy County: Ohio Oil Co. 1 Ralph Nix, 29-18s-26e, 9 miles south of Artesia, IP calculated open-flow, 11,104 M.c.f.d. of gas, Pennsylvanian Bend, 9,070-9,115 ft., TD 10,190 ft., ground elevation 3,416 ft.

Pan American Petroleum Corp. 1-BC State, 4-18s-28e, Abo pay discovery in Artesia field. IP 92 BO in 16 hours, ¼-in. choke, GOR 780:1, TP 750 psi., Abo 6,124-52 ft. TD 6,367 ft., ground elevation 3,673 ft.

Lea County: Continental Oil Co. 27 Baish, 21-17s-32e, Abo pay discovery in Maljamar-Penn. field, recompletion. IP 470 BOPD, ¼-in. choke, Abo 8,977-87 ft. TD 13,670 ft., PB 9,040 ft.

Western Drilling Co. 1 Donegan-State, 3-22s-35e. IPP 36 BOPD, Yates 3,921-39 ft. TD 4,105 ft.

Rio Arriba County: El Paso Natural Gas Co. 32-F Federal, NW SE 32-26n-2w. IPF 1,260 M.c.f.d., ¾-in. choke. Pictured Cliffs discovery, new pool. TD 3,988 ft.

T. H. McElvain 1 Federal, SE NE 12-24n-7w. IPF 2,129 M. c. f. d., ¾-in. choke, Pictured Cliffs discovery, new pool. TD 2,552 ft.

San Juan County: Southern Union Gas Co. 1 Nye, SW SW 20-31n-12w. IPF Dakota 1,521 M.c.f.d., ¾-in. choke; IPF Mesaverde 554 M.c.f.d., ¾-in. choke. TD 7,176 ft.

R&G Drilling Co. 42 Marron, NE SW SW 22-27n-8w. IPF Mesaverde 1,012 M.c.f.d., ¾-in. choke; IPF Dakota 375 M.c.f.d., ¾-in. choke. Dakota discovery, new field. TD 6,734 ft.

NORTH TEXAS

Archer County: Cascade Petroleum Co. 1 Frank McAnally, Sec. 2, EL&RR Sur., A-1044, 6 miles north of Megargel. IPP 129 BOPD, 42°, GOR 150:1, Mississippian 5,272 ft. TD 5,308 ft.

Jack County: Trice Production Co. 2 J. R. Clayton, Sec. 3322, TE&L Sur., 3½ miles northeast of Jermyn. IPP 84 BOPD, 40°, GOR 450:1, Bryson sand 3,342-52 ft. TD 3,530 ft.

Young County: W. E. Burgell et al. 1-A Tom Jeffreys, R. J. Scott Sur., A-258, 1½ miles south of South Bend. Workover completion. IP 2,500 M.c.f.d. of gas, GOR 625,000:1, 45°, Caddo 3,760-90 ft. TD 3,987 ft.

OHIO

Morrow County: Monk Oil & Gas Co. 2 J. N. Monk, Sec. 22, Bennington Twp. IP 100 BOPD, Glenwood and Cambro-Ordovician. 3,589-91, 3,606-17 ft. TD 3,731 ft. New oil pool and first such production in Ohio.

SOUTHWEST TEXAS

Atascosa County: Thomas Drilling Corp. et al. 1-B A. H. Peeler, Section 11, J. Poitevent Sur., A-955, 9 miles south of Christine. IP 43 BOPD, 12/64-in., 21.5°, GOR 1,799 cu. ft. per bbl., TP 290 psi., perf. 3,225-28 ft., Carrizo. TD 6,186 ft. New-field discovery 5 miles southeast of Peeler field.

Brooks County: Texaco Inc. 28 McGill Bros. NCT-1, San Antonio Grant, A-214, 16 miles southwest of Encino. AOF 2,510 M.c.f.d., GLR 125 M.c.f. per bbl., 56°, shut-in TP 3,015 psi., perf. 7,707-22 ft., Vicksburg. TD 8,227 ft. New pay in Encintas field.

Humble Oil & Refining Co. 11 Santa Fe Ranch, San Salvador Del Tule Grant, A-45, 8 miles southeast of Encino. Standing potential gas well, not perforated. TD 9,500 ft. New field.

Dimmit County: Shamrock Oil & Gas Corp. 22 Fitzsimmons et al., Francisco Lombrano Grant, A-1360, 20 miles southwest of Carrizo Springs. AOF 222 M.c.f.d., shut-in TP 1,148 psi., perf. 2,862-71 ft., Olmos. TD 3,150 ft. New pay in Hugh Fitzsimmons field.

Duval County: M. P. S. Production Co. 1 Margarita Garcia et al., Section 311, H&GN Sur., A-306, 6 miles northwest of San Diego. AOF 2,800 M.c.f.d., GLR 68.8 M.c.f. per bbl., 69.1°, shut-in TP 1,790 psi., perf. 4,820-23 ft., Hockley. TD 6,023 ft. New pay in Sabrina-Mag field.

Gulf Coast Mineral Management Corp., John Burkhart et al. 1 Lennie Ray, Section 19, Spring Creek Irrigation Co. Sur., A-750, 10 miles north of San Diego. AOF 4,000 M.c.f.d., GLR 300 M.c.f. per bbl., 64°, shut-in TP 775 psi., perf. 1,899½-1,902½ ft. TD 4,866 ft. New-field discovery.

Hidalgo County: Humble Oil & Refining Co. 260 McGill Brothers, San Antonio Grant, A-578, 5 miles north of Cipres. AOF 3,300 M.c.f.d., GLR 49 M.c.f. per bbl., 55°, perf. 11,998-12,020 ft. and 12,030-50 ft., Vicksburg. TD 12,220 ft. New-reservoir discovery in East Kelsey area.

Jim Hogg County: George H. Coates 3 Virginia T. Pena, Section 578, E. Peyote Grant, 19 miles southwest of Hebbronville. AOF 3,200 M.c.f.d., dry gas, shut-in TP 1,275 psi., perf. 3,708-11 ft. TD 4,658 ft. Extension and new reservoir in El Peyote area.

Jim Wells County: Rand Morgan 9-R Fee, Section 5, Ragland Farms Tracts, 5 miles southeast of Orange Grove. IP

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BOWEN 1935 25th ANNIVERSARY 1960

BOWEN ITCO, INC. P. O. BOX 4587 · HOUSTON 13, TEXAS

MANUFACTURERS OF EQUIPMENT FOR DRILLING • FISHING • COMPLETION • WIRE LINE OPERATIONS

In Canada during 1959, here's footage drilled . . .

	Field				Wildcats		
	Oil	Gas	Dry	Service	Oil	Gas	Dry
Alberta	4,763,854	725,000	750,164	176,556	453,658	419,122	1,586,403
Saskatchewan	1,966,764	19,411	280,877	.....	107,396	11,023	672,696
Manitoba	61,864	.....	1,980	.....	2,105	.....	24,992
British Columbia	52,891	133,714	63,207	.....	20,194	104,406	213,520
Northwest Territories	.....	.....	.....	.....	.....	.....	15,901
Total	**6,845,373**	**878,125**	**1,096,238**	**176,556**	**583,353**	**534,551**	**2,513,512**

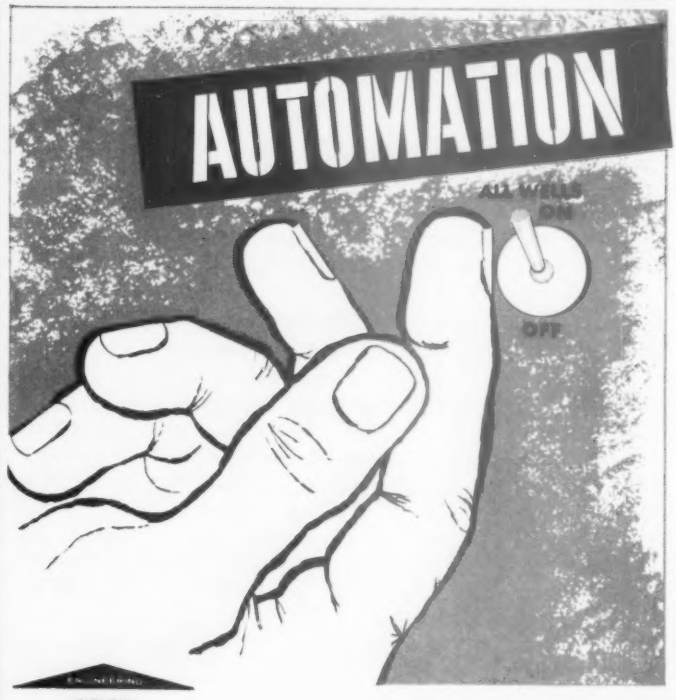
and wells completed

	All wells						Total	Wildcats				
	Total	Oil	Gas	Dry	Service	Footage	1958	Total	Oil	Gas	Dry	Footage
Alberta	1,607	872	257	445	33	8,874,757	1,658	423	62	67	294	2,459,183
Saskatchewan	746	496	14	236	0	3,058,177	783	200	27	4	169	791,115
Manitoba	41	30	0	11	0	90,941	87	11	1	0	10	27,097
British Columbia	107	18	43	46	0	587,932	86	56	5	17	34	338,120
N.W.T.	4	0	0	4	0	15,901	7	4	0	0	4	15,901
Total	**2,505**	**1,416**	**314**	**742**	**33**	**12,627,708**	**2,621**	**694**	**95**	**88**	**511**	**3,631,416**
Ontario	265	19	94	129	23	340,539	.....	.....	.....	.....	.....	.....

WHILE the United States enjoyed a healthy rise in total completions in 1959, western Canada operators finaled 116 less wells during the year than in 1958. There was also a slight drop in exploratory tests drilled north of the border. Total wildcats fell to 694 from the previous year's 709.

The only province showing a gain over 1958 was British Columbia where 107 wells were completed compared to 86 the previous year. The wildcat total in B. C., however, was only 56 compared to 67 the previous year. The success ratio of exploration in British Columbia was high with 22 discoveries out of 56 wildcats drilled in the province.

There were more gas discoveries in Alberta than there were new oil finds. Operators netted 67 new gas fields compared to 62 oil strikes. The Canadian wildcatting success ratio was 26.4%. For the first time the Journal presents the year's tally for Ontario, the only eastern province with available figures.



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FIELD REPORT

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OPERATOR: Superior Oil Company

PUMPS: 4 Aldrich Quintuplex

FLOODING STARTED: May, 1957

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the tough pumping problems go to ALDRICH

77 BOPD, X-27 choke, 39.9°, GOR 421 cu. ft. per bbl., 1,020 psi., perf. 5,285-90 ft. TD 5,750 ft. New pay in Rand Morgan field.

Starr County: Phillips Petroleum Co. 9-A Bentsen, Section 6, Los Maguelles Grant, 18 miles north of Sullivan City. IP 2,690 M.c.f.d., 179 BCPD, 18/64-in., TP 3,060 psi., perf. 9,270-84 ft., Vicksburg. TD 11,145 ft. New-field discovery.

Zavala County: General Crude Oil Co. 1 Kinast, Section 21, Block A, AB&M Sur., A-52, 10 miles south of Batesville. IP 25 BOPD, 16/64-in., 28°, TP 75 psi., perf. 4,402-12 ft., San Miguel. TD 4,710 ft. New-field discovery.

TEXAS GULF COAST

Brazoria County: Gulf Oil Corp. 1 Minnie Holland et al. Unit, George Robinson Sur. 3, A-126, 2 miles southwest of Anchor. AOF 3,150 M.c.f.d., GLR 127 M.c.f. per bbl., 42.9°, shut-in TP 6,384 psi., perf. 10,543-48 ft., Frio. TD 11,068 ft. New pay in Blue Lake field.

Calhoun County: Brazos Oil & Gas Co. Division of Dow Chemical Co. 10 Powderhorn, Section 5, Block J. Calhoun County Cattle Co. Subd., Juan Cano Sur., A-5, 7 miles northwest of Port O'Connor. IP 13 BOPD (net), 39% water, 6/64-in., 30.2°, TP 1,625 psi., GOR 23,486 cu. ft. per bbl., perf. 5,207-10 ft., and AOF 16,700 M.c.f.d., dry gas, shut-in TP 2,077 psi., perf. 5,070-80 ft. TD 5,412 ft. New pays in Powderhorn field.

Superior Oil Co. 4 Maude B. Traylor, Phillip Dimmit Sur., A-11, 6 miles northwest of Olivia. AOF 51 M.M.c.f.d., GLR 17,472 cu. ft. per bbl., 52.2°, shut-in TP 5,691 psi., perf. 10,470-82 ft., Frio. TD 11,425 ft. New pay in North Maude B. Traylor field.

Galveston County: Pure Oil Co. 1 Houston Farms Development Co., Daniel Buckley Sur. 27, A-29, 5 miles south of Hitchcock. AOF 7,900 M.c.f.d., GLR 60 M.c.f. per bbl., 51.1°, shut-in TP 9,300 psi., perf. 16,132-16,264 ft., Frio. TD 17,051 ft. New-field discovery and Texas' deepest production.

Goliad County: Rehler-Carlson et al. 1 Arthur Weise, Jose Maria Mancha Sur., A-203, 5 miles southwest of Weesatche. AOF 15,100 M.c.f.d., GLR 103,090 cu. ft. per bbl., 53.2°, shut-in TP 1,695 psi., perf. 4,361-78 ft., Pettus. TD 4,445 ft. New pay in Melrose area.

Hardin County: James B. Fuller & Associates 2 C. V. Collins, M. M. S. de Casanova Sur., A-11, 4 miles northwest of Votaw. IP 160 BOPD, 11/64-in., 40°, GOR 350 cu. ft. per bbl., TP 600 psi., perf. 5,547-50 ft., Yegua. TD 6,948 ft. New pay in West Menard Creek field.

Atlantic Refining Co.-Sinclair Oil & Gas Co. 1 Harry V. Himes, McKinney & Williams Sur., A-401, 3 miles southeast of Village Mills. IP 247.37 BOPD, 8/64-in., 42.8°, GOR 1,850 psi., TP 2,250 psi., perf. 8,444-51 ft., 2nd Wilcox. TD 10,062 ft. New pay in East Village Mills field.

Jackson County: Texkan Oil Co. 1-A Cora Robertson, Tract 22, Pickering Ranch Subd., Patrick Scott Sur., A-69, 6 miles north of Lolita. IP 155 BOPD, 8/64-in., 39.8°, GOR 579 cu. ft. per bbl., TP 1,075 psi., perf. 6,539-43 ft., Frio. TD 6,988 ft. New pay in North LaWard field.

Liberty County: Sun Oil Co. 1 Stone, Jose Delgado Sur., A-177, 5 miles southwest of Sour Lake. IP 186 BOPD, XX-38 choke, 45.5°, GOR 1,624 cu. ft. per bbl., TP 750 psi., perf. 11,468-74 ft. TD 11,486 ft. New-field discovery.

Matagorda County: Socony Mobil Oil Co., Inc., 2 R. B. Trull, Block 39, Susan Perkins Sur., A-371, 5 miles northwest of Palacios. IP 186.18 BOPD, 12/64-in., 38°, GOR 462 cu. ft. per bbl., TP 400 psi., perf. 8,164-66 ft., Frio. TD 8,306 ft. Second well and new pay in Southwest Pleasant field.

Nueces County: Gulf Coast Min. MGM'T Corp. and Arnold Well Service Co. 1 Annie H. Smith, Section 41, SK&K Sur., A-795, 7 miles southwest of Clarkwood. AOF 16,200 M.c.f.d., 7½ BC per M.M.c.f., 52°, shut-in TP 1,258 psi., perf. 2,883-92 ft., Miocene. TD 3,050 ft. New-field discovery.

Willacy County: William G. Gill and R. W. Sullivan 1 Todd, Lot 5, Block 1, Narcisco Tract 4, 2 miles northeast of La Sara. IP 100 BOPD, 3/16-in., 29.4°, GOR 400 cu. ft. per bbl., 230 psi., perf. 3,488-93 ft. TD 7,050 ft. New pay in La Sara field.

TEXAS PANHANDLE

Hansford County: Texaco Inc. 2 E. M. Carmody "B," Sec. 10, Blk. 2, WCRR Sur., 8 miles northeast of Spearman. IPF 4 M.M.c.f.d., ½-in. choke, Virgil 5,420-27 ft. TD 7,100 ft. Gas discovery.

WEST CENTRAL TEXAS

Fisher County: Ab-Tex Production Co. 1 W. A. Polk, J. Luce Sur. 15, 1 mile west of Royston. IP 132 BOPD, 16/64-in. choke, 42°, GOR 1,561:1, TP 450 psi., Strawn 5,209-17 ft. TD 6,036 ft.

Haskell County: Lone Star Producing Co. 2 M. C. Leech, Sec. 59, Blk. 1, H&TC Sur., 3 miles southeast of Rule. IPP 98

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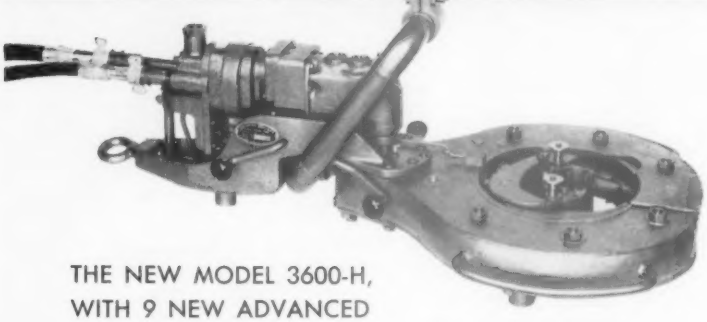

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The December well count in the U. S.

	TOTAL COMPLETIONS							WILDCAT WELLS						
	Total	Crude	Cond.	Gas	Dry	Service	Footage	Total	Crude	Cond.	Gas	Dry	Footage	Act. op.
Alabama	11	9	0	0	2	0	111,739	2	0	0	0	2	7,915	6
Alaska	9	4	0	3	2	0	97,090	1	0	0	1	0	15,047	2
Arizona	2	0	0	0	2	0	4,144	2	0	0	0	2	4,144	9
Arkansas	81	54	0	1	25	1	258,130	11	3	0	0	8	48,399	132
California	132	62	0	8	50	12	614,902	39	2	0	1	36	218,677	91
Colorado	107	22	0	15	70	0	561,115	55	4	0	1	50	275,611	119
Illinois	216	101	0	1	86	28	447,411	30	5	0	1	24	53,807	419
Indiana	95	37	0	1	56	1	129,624	35	2	0	0	33	47,880	91
Kansas	342	139	1	28	169	5	1,217,933	103	8	0	4	91	401,211	401
Kentucky	583	466	0	25	88	4	481,551	54	3	0	1	50	75,588	201
Louisiana	336	154	38	20	124	0	2,382,854	41	2	1	0	38	313,771	414
North	149	73	0	14	62	0	532,470	26	2	0	0	24	151,546	160
South	151	59	32	6	54	0	1,488,382	15	0	1	0	14	162,225	208
Offshore	36	22	6	0	8	0	362,002	0	0	0	0	0	0	56
Michigan	44	20	0	2	22	0	157,136	14	0	0	1	13	36,136	116
Mississippi	64	29	4	1	30	0	613,073	27	1	2	1	23	241,400	61
Montana	35	17	0	0	18	0	160,069	9	0	0	0	9	42,532	57
Nebraska	91	26	0	0	65	0	532,007	54	8	0	0	46	308,919	79
New Mexico	178	88	8	31	51	0	736,012	37	4	2	0	31	139,753	291
West	61	18	7	31	5	0	261,886	5	0	1	0	4	14,006	175
East	117	70	1	0	46	0	474,126	32	4	1	0	27	125,747	116
New York	19	12	0	0	4	3	24,572	0	0	0	0	0	0	12
North Dakota	34	19	1	0	14	0	211,347	9	2	0	0	7	47,588	38
Ohio	109	40	0	28	37	4	247,682	8	1	0	2	5	19,741	211
Oklahoma	313	159	7	27	119	1	1,177,631	48	5	3	5	35	250,272	611
Pennsylvania	54	14	0	24	5	11	159,819	3	0	0	0	3	18,076	51
South Dakota	4	2	0	0	2	0	34,150	2	0	0	0	2	16,975	6
Tennessee	15	1	0	0	14	0	8,066	11	0	0	0	11	5,816	30
Texas	1,491	777	63	59	560	32	6,143,672	314	22	5	7	280	1,487,242	1,127
Dist. 1	84	36	1	5	42	0	237,203	27	1	0	0	26	83,796	43
Dist. 2	62	9	11	10	32	0	375,091	20	0	1	1	18	125,220	49
Dist. 3	108	46	16	4	42	0	694,934	19	1	2	0	16	169,669	104
Dist. 4	113	30	14	10	58	1	549,342	50	2	2	3	43	201,936	95
East	97	44	9	0	44	0	465,618	28	0	0	0	28	171,393	66
Dist. 7-B	243	113	0	9	112	9	691,289	65	4	0	3	58	226,846	86
West	386	292	6	3	85	0	1,887,575	52	10	0	0	42	273,660	433
Dist. 9	300	149	1	4	124	22	771,639	44	2	0	0	42	171,982	108
Dist. 10	98	58	5	14	21	0	470,981	9	2	0	0	7	62,740	143
Utah	34	12	0	6	16	0	159,947	15	0	0	2	13	57,740	48
Washington	1	0	0	0	1	0	10,820	1	0	0	0	1	10,820	1
West Virginia	93	9	0	54	15	15	264,028	1	0	0	1	0	4,656	218
Wyoming	112	34	1	8	68	1	578,436	55	4	1	3	47	262,991	169
Total Dec. 1959	**4,605**	**2,307**	**123**	**342**	**1,715**	**118**	**17,524,964**	**981**	**76**	**14**	**31**	**860**	**4,412,707**	**5,011**
Total Nov. 1959	4,353	2,275	102	277	1,600	99	16,644,067	890	67	6	28	789	4,083,573	5,381
Total 1959	**50,893**	**25,379**	**1,255**	**3,761**	**19,101**	**1,397**	**208,249,518**	**10,073**	**873**	**113**	**340**	**8,747**	**48,322,611**	.....

. . . and in Canada

	All wells						Wildcats				
	Total	Oil	Gas	Dry	Service	Footage	Total	Oil	Gas	Dry	Footage
Alberta	183	107	26	44	6	1,056,483	55	9	14	32	291,236
Saskatchewan	56	39	0	17	0	224,940	14	0	0	14	50,819
Manitoba	5	3	0	2	0	10,373	2	0	0	2	4,600
British Columbia	19	5	5	9	0	101,847	5	0	2	3	33,831
Total	263	154	31	72	6	1,393,643	76	9	16	51	380,486
Ontario	10	0	6	4	0	11,505	..	..	..	..	.....

BOPD, 39°, GOR 567:1, pay 4,868-78 ft. TD 4,908 ft.

Humble Oil & Refining Co. 4 Harrison estate, Sec. 79, Blk. 1, H&TC Sur., 2½ miles northeast of Sagerton. Dual completion. IPP 60 BOPD, 41°, Strawn 4,890-4,900 ft.; IPP 145 BOPD, 38°, Lower Strawn 5,109-21 ft. TD 5,608 ft.

Palo Pinto County: G. E. Kadane & Sons 1 TXL, Sec. 49, Blk. 1, T&P Sur., 4½ miles south of Palo Pinto. IP, shut-in gas well. Strawn sand 1,844-64 ft.

Parker County: Toto Gas Co. 1-B Seaberry, A. E. Winfrey Sur., A-1,591, ½ mile west of Poolville. IP 850 M.c.f.d. of gas, TD 5,400 ft.

Shackelford County: Graridge Corp. 1 Creslenn-Parrish, Sec. 3, OAL Sur., 3 miles northeast of Sedwick. IP 3 M.M.c.f.d. of gas, 22 BOPD, 2,089-93 ft. TD 4,021 ft.

Taylor County: The New Seven Falls Co. 1 Laura J. Reid, Sec. 126, Blk. 64, H&TC Sur., 6 miles west of Bradshaw. IP 126 BOPD, 12/64-in. choke, 46°, GOR 1185:1, TP 420 psi., Gray sand 4,993-96 ft. TD 5,041 ft.

Throckmorton County: Columbian Fuel Corp. 1-11 T. G. Hendrick estate, Sec. 11, Brooks & Burleson Sur., M-5, 25 miles northwest of Albany. IP 750 M.c.f.d. of gas, Bluff Creek 1,270-78 ft. TD 1,300 ft.

WYOMING

Converse County, Shawnee area: Macson Oil Co. 1 Hall, C SE SE 11-33n-69w. IPF 2,500 M.c.f.d., 18/64-in. choke, 56 BCPD, 50°. Mesaverde discovery, new field. TD 7,360 ft.

Fremont County: Lysite area: Gulf Oil Corp. 1 Lysite-Federal, SW NE 23-39n-91w. IPF 21 M.M.c.f.d., open flow, 6,780-86, 6,796-6,809, and 6,815-27 ft. TD 7,328 ft. Lance discovery, new field.

Sweetwater County, West Desert Springs discovery well: Texas National Petroleum Co. 1 Government-W. T. Withers, SW NE NE 32-20n-99w. IPF 300 BOPD, 18/64-in. choke, Almond discovery, new field. TD 3,677 ft.

December footage breakdown

	FIELD WELLS					WILDCAT WELLS			
	Oil	Cond.	Gas	Dry	Service	Oil	Cond.	Gas	Dry
Alabama	103,824								7,915
Alaska	46,988		10,820	24,235				15,047	
Arizona									4,144
Arkansas	141,414		6,650	58,567	3,100	8,337			40,062
California	238,302		39,767	74,025	44,131	12,990		7,447	198,240
Colorado	88,184		79,866	117,454		17,704		4,700	253,207
Illinois	224,915			128,049	40,640	11,629		621	41,557
Indiana	52,371		888	25,953	2,532	2,167			45,713
Kansas	429,458	6,088	81,277	285,752	14,147	31,982		20,734	348,495
Kentucky	284,606		77,911	40,827	2,623	3,548		1,358	70,682
Louisiana	877,507	451,360	123,374	616,842		9,262	9,865		294,644
North	157,607		63,544	159,773		9,262			142,284
South	516,589	384,499	59,830	365,239			9,865		152,360
Offshore	203,311	66,861		91,830					
Michigan	70,000		3,900	47,100				3,500	32,636
Mississippi	285,691	25,541		60,441		21,500	14,209	9,492	196,199
Montana	79,346			38,191					42,532
Nebraska	104,992			118,096		46,534			262,385
New Mexico	316,876	38,771	145,756	94,856		21,496	15,257		103,000
West	62,099	38,771	145,756	1,254			6,498		7,508
East	254,777			93,602		21,496	8,759		95,492
New York	15,252			2,800	6,520				
North Dakota	113,432	11,755		38,572		21,195			26,393
Ohio	105,611		66,289	45,861	10,180	1,814		5,834	12,093
Oklahoma	512,232	28,770	136,808	248,781	768	28,787	26,063	34,503	160,919
Pennsylvania	26,007		88,144	5,798	21,794				18,076
South Dakota	17,175								16,975
Tennessee	425			1,825					5,816
Texas	2,860,244	503,072	247,198	983,318	62,598	154,974	41,104	31,969	1,259,195
Dist. 1	77,607	10,790	16,925	48,085		6,050			77,746
Dist. 2	59,474	85,985	49,217	55,195			11,614	7,112	106,494
Dist. 3	221,240	141,859	24,975	137,191		9,922	24,755		134,992
Dist. 4	126,881	105,139	38,459	75,530	1,397	14,418	4,735	13,012	169,771
East	162,079	71,756		60,390					171,393
Dist. 7-B	291,636		21,892	138,696	12,219	21,102		11,845	193,899
West	1,370,841	43,375	25,833	173,866		78,228			195,432
Dist. 9	320,723	6,300	13,677	209,975	48,982	12,114			159,868
Dist. 10	229,763	37,868	56,220	84,390		13,140			49,600
Utah	69,856		18,360	13,991				3,557	54,183
Washington									10,820
West Virginia	18,744		141,791	38,214	60,623			4,656	
Wyoming	150,991		33,755	125,674	5,025	14,710	7,360	17,225	223,696
Total U. S.	**7,234,443**	**1,065,357**	**1,302,554**	**3,235,222**	**274,681**	**408,629**	**113,858**	**160,643**	**3,729,577**

DECEMBER FOOTAGE BREAKDOWN IN WESTERN CANADA

	Field				Wildcats		
	Oil	Gas	Dry	Service	Oil	Gas	Dry
Alberta	612,698	65,607	52,503	34,439	64,269	80,298	146,669
Saskatchewan	161,913		12,208				50,819
Manitoba	5,773						4,600
British Columbia	20,143	17,733	30,140			14,272	19,559
Total	800,527	83,340	94,851	34,439	64,269	94,570	221,647

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VALVES

Lewis Finch, Jr.
. . . chose oil over government, steel careers.

Cut Costs to Stay Competitive

. . . says Pan American's new chief of domestic production. To him, shaving costs of operations is sound business.

LEWIS FINCH, JR., had three choices of jobs when he left Oklahoma State University campus with a civil engineering diploma.

He turned thumbs down on a state highway department job offer—too political and insecure, he reasoned.

He vetoed a structural steel contractor's spot—apprenticeship lasted too long for him.

He chose the oil patch as the place to begin an engineering career and took a job as a roustabout at Hobbs, N. M.

The company was Stanolind, now Pan American Petroleum Corp. Finch's choice was a solid one. He's still with the company and has just moved into a key role as manager of its domestic producing operations.

There have been a lot of milestones along the way during his 22 years in the oil business.

Finch was 7 years out of college when he directed the drill-stem test of the Midland Farms pool discovery well in Andrews County, Texas. Now, 14 years later, there are 400 wells producing there. He also played a part in the discovery of Three Bar pool and the early development of Fullerton field in Texas.

Just 10 years after his first roustabouting assignment, he was named superintendent of the Midland, Tex., district for Pan Am with 450 employes under his supervision.

Other important whistlestops in Finch's career have found him at Fort Worth, North Cowden, Odessa, Midland, and Tulsa.

Finch was called upon to direct proration cases before the Texas Railroad Commission for his company from 1941 through 1943. Hitches at Odessa and Midland preceded his move to Tulsa in 1948 as executive assistant to the exploration and production vice president. He has been in Tulsa since.

Views . . . In taking over his new post, calling signals on production work in the United States and Canada, Finch has no illusions of pulling from a hat panaceas for possible ills of the industry.

"It's been said before and it is simply sound business—you must cut costs today to stay competitive," he says. "Automation is moving fast, improved drilling and completion practices are going forward—many changing patterns have a place in oil production today."

And, an aside to engineering students from one who knows:

"Management depends on skilled engineering in its field work and in all phases of its producing operations. The chances for a man with engineering talents today are as great as ever."

Early background . . . Finch was born in Owasso, Okla., and helped in his father's grocery store during grade and high-school days. A budding musical career was scotched when a competitor in a marble game accidentally stepped on his violin, and wrecked it.

He took 2 years of engineering work at Oklahoma State at Stillwater and shifted to the University of Tulsa for 1 year of geological and other studies in 1934-35. He worked nights in a bakery during that year. Back to Oklahoma State he went for 2 years and was graduated in 1937.

In college, Finch tried freshman basketball but found that engineering studies interfered. He tried campus politics, was a member of the student senate, and president of Acacia fraternity. His extracurricular work has kept pace with his oil advances. He was vice president of the Petroleum Engineers Club in Fort Worth and served as president of the Permian Basin Engineering Association in 1944.

In 1938, he married Miss Myrtice Heller, Stillwater, Okla., whose father was director of the agricultural chemistry department. They have one daughter, Martha Ann, a sophomore at Edison high school.

Finch, an avid golfer in his spare time, is a director of the Petroleum Club of Tulsa and of the Society of Petroleum Engineers of AIME. He also is a member of St. John's Episcopal church and of several professional and industrial organizations.

He is a 1954 graduate of the Advanced Management Program of Harvard business school.

●

James McGovern of the mechanical department at Esso Standard's Bayway refinery, Linden, N. J., has accepted a temporary assignment with Esso Nederland N. V. He will be advisory mechanical foreman during start-up of the company's new Rotterdam refinery.

▶▶▶ Personals

Dr. Franklin Veatch has been promoted to the new position of research director in charge of petrochemicals, polymers, and new processes at the Warrensville Heights, Ohio, research center of Standard Oil Co. (Ohio). Veatch has been with the company since 1942. He was an inventor of Sohio's patented plastic spheres used to prevent storage evaporation. Veatch more recently was leader of the research team working on discovery and development of acrylonitrile.

Preston L. Reeder, formerly in Warren Petroleum Corp.'s natural-gasoline purchase and sales division, Tulsa, has joined Debco Corp. of Texas, independent motor fuel supplier, as a vice president. He will headquarter in Abilene, Tex.

Louis A. Williams, Sun Oil Co., has been elected president of the Abilene, Tex., Geological Society. Other new officers are **Jack B. Ryan,** Jake L. Hamon, vice president; **Frank L. Schatz,** Sun, secretary; and **Eugene M. Goltz,** Katz Oil Co., treasurer.

Edward C. Greco, senior research chemist for United Gas Corp., Shreveport, La., is newly elected vice president of National Association of Corrosion Engineers. **J. S. Dorsey,** Southern California Gas Co., Los Angeles, has been elected a director of the association.

Wayne Elledge, plant engineer in El Paso Natural Gas Products Co.'s Ciniza, N. M., refinery, has been promoted to chief project and mechanical engineer for the company. The appointment is effective March 1. **George Harrison,** chief inspector for the company, will succeed Elledge at the Ciniza refinery. **Don Watzke** will succeed Harrison.

James B. Kelley, Philadelphia sales division general manager for Gulf Oil Corp., has been transferred to New York as division general manager. He succeeds **W. D. Nelson. E. L. Hemming,** formerly coordinator of retail and jobber sales in the Pittsburgh general office, will succeed Kelley in Philadelphia. In New York, **Robert B. Phillips,** formerly director of plans and programming, marketing coordination, in Pittsburgh, has been named division manager, retail and jobber sales. He succeeds **L. S. Auerbach. H. P. W. Christiansen** will succeed Phillips in Pittsburgh.

James M. Gray, Jr., has been named supervisor of maintenance in Petro-Tex Chemical Corp.'s Houston research center.

T. O. Megas, vice president of Westcoast Transmission Co., Ltd., has resigned to open consulting offices. He will continue with Westcoast as a consultant.

Robert Tietsworth, formerly geologist with Amerada Petroleum Corp. in Rio Vista, Calif., has joined Occidental Petroleum Corp. in Bakersfield, Calif.

William B. Anderson, formerly supervisor of the clean-oil section of Tidewater Oil Co.'s western division oil purchase and exchange department, has been named supervisor of oil purchase and exchange operations, a new position. He will continue to headquarter in Los Angeles.

Sohio Petroleum Co. has set up an exploration and a production department in Oklahoma City in a move to streamline operations there. **R. W. Edmund,** who has been head of the combined departments, will be general manager of the exploration department. **Frank Willibrand,** Mid-Continent division manager, will head the production department.

Cecil O. Smith, Carter division of Humble Oil & Refining Co., has been named chairman of the Tulsa section, National Association of Corrosion Engineers. He succeeds **P. D. Muir,** Dowell Division of Dow Chemical Co. Other new officers include **Ray W. Amstutz,** Earlougher Engineering Co., vice chairman; **Herbert M. Cooley,** Bethlehem Steel Co., supply division, secretary, **James A. Rush,** Nalco Chemical Co., treasurer; and **Richard E. Lembcke,** Cities Service Research & Development Co., trustee.

John F. McWilliams, Jackson, Miss., district geologist for Union Producing Co., has been named manager of Union's land and lease department, a new position. He will headquarter in the Shreveport, La., general office. **T. L. Aubin, Jr.,** formerly New Orleans district engineer, has been promoted to senior engineer, gas supply department, in Shreveport. Aubin will be succeeded by **C. H. Young, Jr.,** formerly southwest Louisiana district engineer for United Gas Pipe Line Co., an affiliate. **J. H. Huffman,** advanced engineer in Monroe, La., will succeed Young in Lafayette. **George A. Loker, Jr.,** supervisor of gasoline plants, has been named assistant general superintendent, gasoline department.

W. G. (Bill) Bauman has been named crude-oil buyer for Cameron Crude Oil Corp. in Wichita.

John A. Redding, officer in the utilities and oil division of Continental Illinois National Bank & Trust Co. of Chicago, has been promoted to second vice president.

M. D. Gilchrist, M. R. Schrein, and **R. E. Sutherland,** vice presidents of Universal Oil Products Co., have been elected senior vice presidents. **F. O. Newton,** vice president, has been elected staff vice president, a new position. **B. J. Flock,** manager of technical services, has been named a vice president.

Roy M. Mays, Fort Worth, has been appointed director of reserves and production acquisitions by Continental Oil Co. He will headquarter in Houston. Mays will be in charge of acquisition activities formerly handled by **K. W. Brill,** a vice president. Brill was recently named assistant general manager of the Rocky Mountain region and transferred from New York to Denver. Mays was formerly assistant general manager of Conoco's southwestern region.

MAYS

Vincent L. Verdiani, manager of the wholesale department in Sun Oil Co.'s New York sales region, has been appointed manager of a new fuel-oil department. He will headquarter in Philadelphia. **Anthony L. Anderson,** formerly manager of Sunheat and distributor sales, has been appointed assistant manager of the department. **Kingsley E. DeRosay,** manager of cargo and industrial fuel-oil sales, will be on special assignment in the department until his retirement.

R. O. Swayze has been appointed manager of production in Mobil Oil Co.'s Los Angeles division. **H. D. Hobson** has been named manager of exploration, Los Angeles. Both men held similar posts with General Petroleum Corp. before its merger with Mobil. Also in Mobil's Los Angeles division, **James Ross** has been named regional manager of purchases. He succeeds **P. J. Whiteley,** who has retired. **E. W. Millaird** has been appointed senior buyer.

▶▶▶ Personals

AIME Honors A. C. Rubel

Albert C. Rubel, president of Union Oil Co., has been awarded AIME's Anthony F. Lucas gold medal recognizing service to the industry. The award will be presented February 17 in New York. Rubel has been with Union since 1923 and was elected president in 1956. He is a former director of AIME and of the American Petroleum Institute. He also has served as vice chairman of the Military Petroleum Advisory board.

'Abd Al-Fattah Ibrahim, director general of the Iraq Government Oil Refineries Administration (GORA), has been appointed director general of the Iraqi General Petroleum Commission. **Dr. Jamil Thabit,** director general of industrial planning in the Ministry of Industry, succeeds Ibrahim in the refining post.

Clark A. Gruver, formerly manager of services for Mobil Oil de Venezuela, has been appointed assistant manager of Mobil Oil of Canada, Ltd., Libyan branch. Headquarters of the company, an affiliate of Mobil International Oil, is in Tripoli, Libya. Gruver joined the Mobil companies in Venezuela in 1939.

Philip T. Ernst, manager of Sun Oil Co.'s Oceanside, N. Y., sales district, has been named manager of distributor sales in the New York sales region. **Ernest R. Johnson** will succeed Ernst in Oceanside. **E. Thomas Lillard** will succeed Johnson as district manager in South Amboy, N. J. Lillard will be succeeded as manager of the Newark, N. J., sales district by **Albert F. Cariello,** formerly manager of retail sales in the Empire State region.

George Y. King, resident geologist in Newark, Ohio, for Mobil Oil Co., has been promoted to district geologist and transferred to Pittsburgh.

F. L. Ballard, production engineer with Great Western Drilling Co., has been transferred to Caprock, N. M., from Sundown, Tex.

J. P. Herrin, formerly senior process engineer in Sinclair Oil & Gas Co.'s gas-products department, has joined Texas Petro Gas Co. as chief engineer. Herrin had been with Sinclair since 1949.

Henry I. Sims, formerly with Phillips Petroleum Co., and **Don F. Tankersley,** formerly with Sohio Petroleum Co., have joined the reservoir engineering division of Natural Gas Pipeline Co. of America in Amarillo, Tex.

William Neill, senior engineer in economics and design at Esso Standard's Bayway refinery, Linden, N. J., has been transferred to the mechanical technical service division at Bayway. He will take over as corrosion engineer in this division, succeeding **Dick Noyes,** who has resigned.

John M. Lovejoy, New York consultant on oil investments, has been awarded an honorary membership by the American Institute of Mining, Metallurgical, and Petroleum Engineers. Lovejoy is former manager and vice president of Amerada Petroleum Corp. and also was president and chairman of the old Seaboard Oil Co. at one time. He is a past president of AIME.

Nine new members of the executive committee were named at last week's annual meeting of Mid-Continent Oil and Gas Association, Kansas-Oklahoma division. The committee members include **H. C. Harris, Jr.,** Atlantic Refining Co.; **Joseph L. Seger,** Carter division of Humble Oil & Refining Co.; **William F. Styler, Jr.,** Crescent Petroleum Corp.; **Ken Davis, Jr.,** Loffland Brothers Co.; **E. V. Watts,** Mobil Oil Co.; **G. D. Ashbranner,** Shell Oil Co.; **Don H. Miller,** Skelly Oil Co.; **C. C. Irby,** Sohio Petroleum Co.; and **J. W. Rawley,** Texaco Inc. Newly named directors of the association are **W. H. Garbade,** Crescent Petroleum; **William H. Morris,** Sinclair Oil & Gas Co.; Harris; Watts; Irby; and Rawley. The association elected five men to life membership in honor of past services to the division. They are **Reid W. Bond,** Shell; **A. E. Chester,** Mobil Oil; **J. W. Jordan,** Sinclair Oil & Gas; **O. O. Kerr,** Crescent Petroleum; and **John S. Wertz,** Vickers Petroleum Co.

Robert Zinke, formerly a geologist for W. M. and A. P. Fuller, and **Howard E. Davis, Jr.,** Midland, Tex., independent, have formed Davis & Zinke, geological consulting firm in Midland.

W. A. (Bill) Hover, formerly manager of West Texas-New Mexico operations of Fred W. Shield, San Antonio, Tex., independent operator, has joined Zapata Petroleum Corp. as vice president. He will headquarter in Midland.

O. C. Johnson, regional manufacturing manager for Mobil Oil Co. for the past year, has been named manager of manufacturing operations. Johnson was operating superintendent and manager of the company's East St. Louis, Ill., refinery before moving to New York in 1956 as central region manager.

Rex V. Campbell has resigned as general superintendent of American Louisiana Pipe Line Co. to open consulting offices in Oklahoma City. A graduate mechanical engineer, with 25 years' experience in design, construction, and operation with four major pipelines, he will specialize in compressors, pipelines, and measurement stations in the gas-pipeline business.

E. J. Gallagher, general manager of British American Oil Co.'s production and pipeline department, has been elected president and a director of Peace River Oil Pipe Line Co., Ltd. He succeeds **E. D. Loughney,** recently named president of British American. **T. W. G. Thomson,** vice president of Texaco Exploration Co., has been elected treasurer of Peace River. He succeeds **E. C. Babson,** Union Oil Co., who recently was transferred to Los Angeles from Calgary. British American is operator of the Peace River line.

GALLAGHER

M. A. E. Hodgson has been appointed development director in the heavy organic chemicals division of International Chemical Industries, Ltd.

Robert D. Joyce, administrative assistant to the executive vice president of Natural Gas Pipeline Co. of America, has been named superintendent of the work-order department. **Fred L. Scott,** resident engineer in Hersher, Ill., for Natural Gas Storage Co. of Illinois, an affiliate, will succeed Joyce.

C. Hayden Atchison, division exploration manager for British-American Oil Producing Co. in Midland, Tex., has been promoted to exploration coordinator in the company's Dallas headquarters. Atchison will take over duties formerly handled by **R. C. Marmaduke,** who has joined Austral Oil Exploration Co., Inc., as

ATCHISON

MARMADUKE

vice president and exploration manager. In other British-American changes, **Hugh M. Looney,** division geologist in Midland, will succeed Atchison there. **Jack L. Hollis** has been named exploration administrator for the company in Dallas and will continue as chief geophysicist.

C. F. Mackey has been appointed plant manager at the new Houston organo-metallic production plant of Texas Alkyls, Inc.

Howard Kiatta, Denver division land man for Texaco Inc., has been promoted to assistant to the Denver division manager. **Jack E. Robbins,** assistant division land man, will succeed Kiatta.

John F. Daley, vice president, member of the executive committee, and former general manager of the organic chemicals department of Du Pont Co., has retired. He will continue as a director of Du Pont. Daley has been with the company since 1915.

J. C. Taylor, Jr., engineer for Humble Oil & Refining Co. in Midland, Tex., has been transferred to Snyder, Tex., as production engineer.

Perry A. Peterson, manager of the Chesapeake region of Cities Service Oil Co., has been named assistant marketing manager for Cities Service Co. He will headquarter in New York.

Dwain L. (Mike) Williams has been appointed district representative, domestic crude-oil supply, for Gulf Oil Corp. in Denver. Williams has been with Gulf since 1948.

Jack P. Robbins, manager of the oil and gas division of Skinner Corp., Seattle, has been elected vice president in charge of the oil and gas division. Robbins joined Skinner in 1952 as a petroleum engineer. He will continue to headquarter in San Antonio, Tex.

B. R. Fraser has been appointed manager of a new manufacturing department set up in the London office of Mobil Oil Co., Ltd. Fraser was formerly manager of the company's Coryton, England, refinery. **J. W. Bartholomew** will succeed him is this position. **C. E. Dean** has been named assistant manager of the Coryton refinery.

Ronald A. Baker, formerly manager of the technical department of General Petroleum Corp.'s manufacturing department, Los Angeles, has been named assistant manager, technical service division, in Socony Mobil Oil Co.'s New York research department. **Stephen P. Cauley,** formerly assistant manager, fuel oil division, in Mobil Oil Co.'s gasoline and fuel oil department, has been appointed pricing manager for Mobil Oil.

▶▶▶ Personals

Harold Waldman and **Sidney Gottfried** have joined the research staff of Western Petrochemical Corp.'s Newark, N. J., lab in the polymer division.

William M. Cocke, assistant general manager of Cit-Con Oil Corp., has been elected vice president and general manager. Cocke came to Cit-Con in 1947 from Continental Oil Co. Cit-Con is owned by Cities Service Co. and Conoco.

Paul W. Whitaker and **Ben D. Leverett** will direct Canadian operations of Empire State Oil Co. in the company's new Calgary office. Head office of the company is in Thermopolis, Wyo.

Robert B. Harkins, vice president of Panhandle Eastern Pipe Line Co., has been transferred to Liberal, Kans., from Kansas City. Harkins was promoted to vice president from assistant to the vice president, operations, a few months ago.

Raymond A. Reinke, manager of commercial development for Continental Carbon Co., subsidiary of Continental Oil Co., has been promoted to vice president in charge of Continental Carbon's international division. He will continue to headquarter in Amarillo, Tex.

Otto Gans, manager of Sun Oil Co.'s Rochester, N. Y., sales district, has been appointed manager of the Albany, N. Y., district. He succeeds **Richard G. Lloyd,** who has taken a leave of absence because of illness. **Rudolph G. Ernst** will succeed Gans in Rochester.

▶▶▶ Deaths

Austin C. Ross, 66, retired vice president of Worthington Corp., died January 8 in a Buffalo, N. Y., hospital after a long illness. Ross joined Worthington in 1932. He was general manager of the compressor and engine division before being elected a vice president in 1950. He retired in 1958.

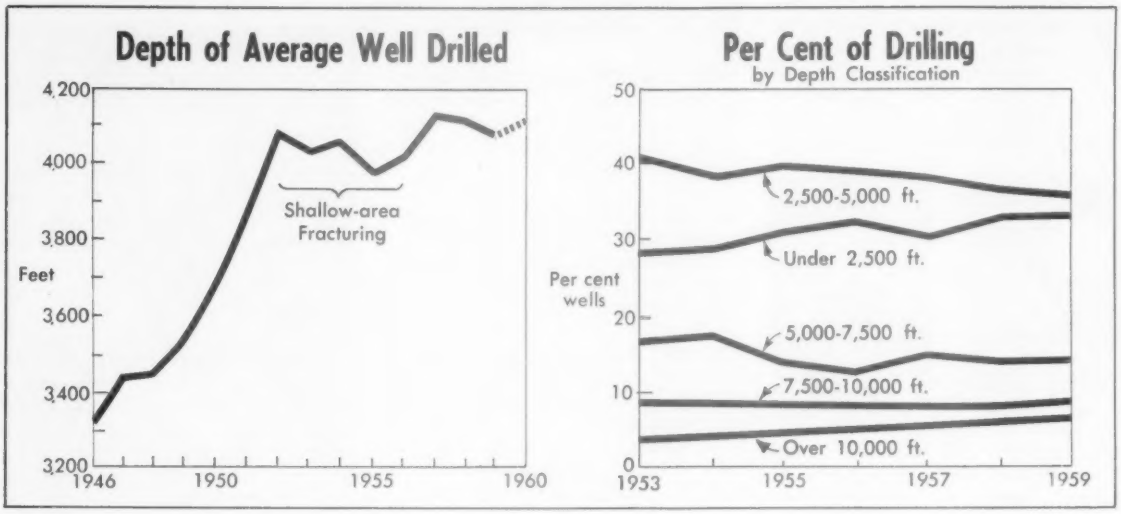
Keith B. (Slim) LeGar, 70, retired vice president and superintendent of Trico Oil & Gas Co., Oakland, Calif., died January 8 in a Bakersfield, Calif., hospital. LeGar was superintendent of Pacific Oil Co.'s Elk Hills division when that company was merged with Standard Oil Co. of California. He later was a field superintendent for California Standard. He retired from Trico last year.

Elbert A. Hamilton, retired southern district manager for Raybestos-Manhattan, Inc., Manhattan Rubber division, died January 6. He was 69.

Joseph F. McCarthy, 76, one of the founders of Eastern States Petroleum Co., now Eastern States Petroleum & Chemical Corp., died January 16 in New York. McCarthy had been vice president, a director, and manager of the New York office for Eastern States before his retirement last year. He was with Sinclair Oil Corp. and Lotus Oil & Distributing Corp. before helping found Eastern States in 1935.

James P. Wible, Jr., 63, retired division secondary-recovery engineer for Gulf Oil Corp. in Tulsa, died January 18 in a Tulsa hospital after a heart attack. A graduate of the University of Pittsburgh, Wible had been with Gulf 32 years before retiring in 1958.

Elmer E. Pankow, 64, superintendent of Empire Petroleum Co.'s Denver refinery, died January 11 in a Denver hospital. Pankow had been with Empire in Denver since 1948.



More wells will be deeper in 1960

BY JOHN C. CASPER

THE AVERAGE WELL drilled in this country went deeper every year during the period 1946-52. Since that time there has been a leveling off with some years showing decreases in average well depth.

The sharp upward trend for the early postwar years is shown in the left chart. The average well drilled in 1956 was only 3,321 ft. It was down to 4,085 ft. by 1952.

Note that there was a declining trend for several years following 1952. The average has been slightly higher since 1956 but there has been nothing to compare with the sharp upward trend in the 1946-52 period.

There have been several reasons for this plateau of the past 7 years.

1. Development of and growth in the use of fracturing in recent years has made it profitable to drill and complete wells in some of the old shallow pays that had been abandoned during early development periods. These shallow wells tended to reduce the average well depth for the year.

2. There has been a decline in the ratio of wildcats to development wells since about 1951. Wildcat drilling accounted for 23.14% of all well completions in 1951, the highest ratio since the end of World War II. Since that time there has been a general decline to 19.52% in 1958 and a slightly better showing of 19.79% in 1959. The forecast for 1960 shows a wildcat ratio of 20.82%.

Fewer wildcats per thousand wells means lower footage per well because the average development well does not go as deep as a comparable wildcat. In 1959, the average wildcat for the country was 4,797 ft. deep. The average development well was 3,918 ft.

Recent decreases in well allowables have tended to boost development drilling. Low payout on exploration and wildcat-drilling costs has almost forced the operator to develop the new field at a rapid pace to bring the over-all payout within a reasonable period. Increased demand for domestic crude over the next 5 years will help reduce the surplus producing capacity.

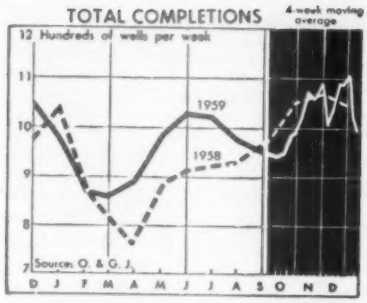
3. Big plays in very shallow areas in 1958 and 1959 have tended to reduce the average well depth. For example, 1,595 development wells were reported for Green County, Kentucky, last year. But all of these wells accounted for only 861,000 ft. of hole. Compare this average with the 645 wells drilled in Mississippi, representing 6,076,000 ft. of drilling.

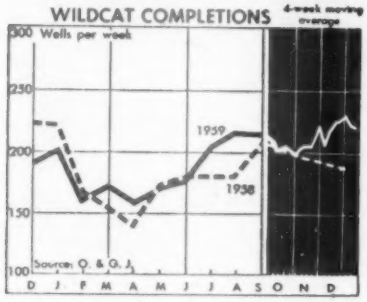
4. The right chart shows that drilling is increasing at the extremes of the depth ranges and declining in the middle. There is a slight upward trend to the line that denotes percentage of wells under 2,500 ft. The line for wells over 10,000 ft. also shows a gain. The other lines are either level or have a downward trend.

Operators' reports of plans for 1960 show a return to more wildcatting and deeper drilling. The average well for the year is expected to be about 4,125 ft. compared with 4,092 ft. in 1959.

A quick look at the highlights

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	7,179,330	UP	19,940	DOWN	19,830
Crude stocks	248,910,000	DOWN	3,990,000	DOWN	11,345,000
Comp'etions	1,118	UP	210	UP	82
Refinery runs	8,302	DOWN	94	UP	173
Gasoline stocks	196,514,000	UP	2,566,000	UP	5,766,000
Kerosine stocks	26,583,000	DOWN	269,000	UP	3,348,000
Distillate stocks	138,539,000	DOWN	5,595,000	UP	29,444,000
Residual stocks	51,263,000	DOWN	1,095,000	DOWN	8,105,000
Four-product stocks	412,899,000	DOWN	4,393,000	UP	30,453,000
Total imports	1,779,800	UP	70,500	DOWN	41,100





Active Rotary Rigs

	1-18-60	1-11-60	1-19-59
Alabama	5	5	9
Arkansas	14	13	11
Arizona	0	0	0
California	68	77	78
Land	62	70	73
Offshore	6	7	5
Colorado	30	34	23
Florida	1	2	1
Land	1	2	1
Offshore	0	0	0
Illinois	31	26	44
Indiana	3	2	6
Iowa	1	0	3
Kansas	111	117	118
Kentucky	6	8	7
Louisiana	282	277	317
North	28	32	44
S. Inland waters	107	104	127
S. Land	92	89	113
Offshore	55	52	33
Maryland	0	0	2
Michigan	32	36	10
Mississippi	70	70	56
Missouri	1	1	0
Montana	13	20	17
Nebraska	21	19	22
Nevada	0	0	0
New Mexico	94	96	94
New York	0	0	0
North Dakota	20	22	30
Ohio	4	4	3
Oklahoma	169	174	194
Oregon	0	0	0
Pennsylvania	13	13	11
South Dakota	5	5	0
Texas	539	562	678
S. Inland waters	5	6	3
S. Land	163	161	124
Offshore	0	0	2
North-East	109	122	149
West Central	168	183	265
West	94	90	135
Utah	27	28	30
Washington	1	1	1
West Virginia	4	4	3
Wyoming	52	57	54
Total U. S.	**1,617**	1,673	1,822
Western Canada	231	223	203
Eastern Canada	4	5	0
Grand total	1,852	1,901	2,025

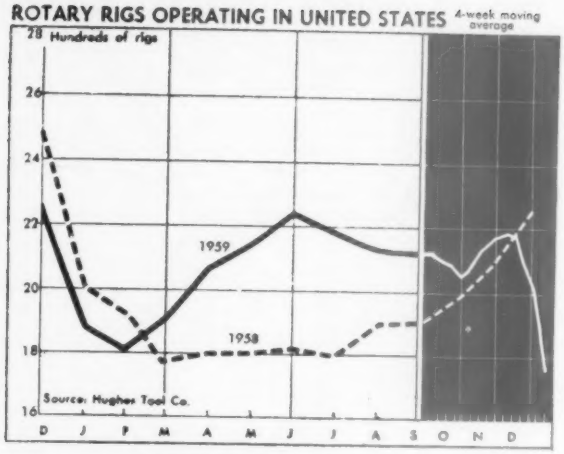
Hughes Tool Co. report.

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JANUARY 16, 1960

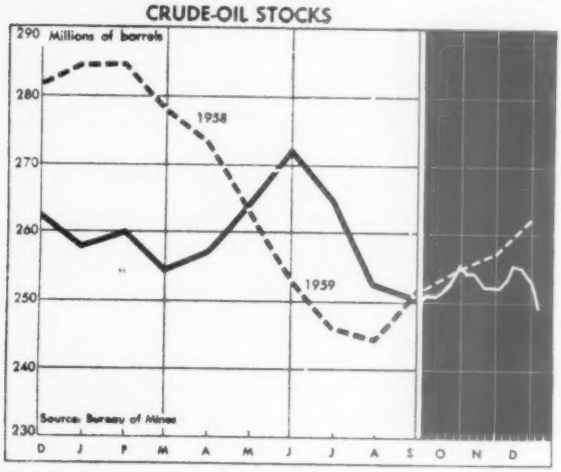
	Total wells							Cum.		Total wildcats					Cum.	
	Total	Crude	Cond.	Gas	Dry	Service	Footage	1960	1959	Total	Crude	Cond.	Gas	Dry	1960	1959
Alabama	2	2	0	0	0	0	23,148	3	10	0	0	0	0	0	0	2
Arizona	3	0	0	0	3	0	8,198	5	.....	3	0	0	0	3	5	.....
Arkansas	9	5	0	1	3	0	30,742	32	54	4	0	0	1	3	10	19
California	27	14	0	2	11	0	134,804	100	108	10	1	0	1	8	26	29
Colorado	17	3	0	4	10	0	96,029	33	44	9	2	0	1	6	21	23
Illinois	56	15	0	2	22	17	124,142	89	131	9	1	0	0	8	17	24
Indiana	18	5	0	0	13	0	31,060	50	34	9	0	0	0	9	17	8
Kansas	74	34	0	1	37	2	259,085	159	257	22	3	0	0	19	50	70
Kentucky	57	49	0	1	4	3	31,693	96	93	3	0	0	0	3	11	5
Louisiana	35	15	4	1	15	0	340,668	207	201	7	0	0	1	6	28	33
North	4	0	0	1	3	0	20,755	71	67	2	0	0	1	1	12	18
South	27	12	4	0	11	0	280,548	103	115	5	0	0	0	5	15	14
Offshore	4	3	0	0	1	0	39,365	33	19	0	0	0	0	0	1	1
Michigan	12	3	0	0	9	0	43,110	41	27	7	0	0	0	7	14	7
Mississippi	10	6	0	0	4	0	95,926	46	50	3	0	0	0	3	18	27
Montana	3	1	0	0	2	0	14,427	14	17	2	0	0	0	2	8	5
Nebraska	15	3	0	0	12	0	85,160	40	33	7	2	0	0	5	16	14
New Mexico	82	52	0	12	18	0	368,626	124	86	10	1	0	0	9	13	11
West	26	11	0	12	3	0	98,811	43	.....	2	0	0	0	2	2	.....
East	56	41	0	0	15	0	269,815	81	.....	8	1	0	0	7	11	.....
New York	22	13	0	0	9	0	29,700	25	14	0	0	0	0	0	2	1
North Dakota	11	4	0	0	7	0	64,141	17	24	3	0	0	0	3	4	7
Ohio	39	17	0	16	4	2	115,082	97	22	1	1	0	0	0	3	2
Oklahoma	67	34	6	4	23	0	329,067	161	310	15	4	2	1	8	36	64
Pennsylvania	0	0	0	0	0	0	0	6	0	0	0	0	0	0	2	0
South Dakota	0	0	0	0	0	0	0	2	.....	0	0	0	0	0	2	.....
Texas	505	282	25	17	166	15	2,250,290	1,054	1,140	93	8	2	3	80	229	254
Dist. 1	14	11	0	1	2	0	40,310	79	102	1	0	0	0	1	29	22
Dist. 2	9	2	2	1	4	0	58,117	52	62	2	0	0	0	2	13	17
Dist. 3	49	18	15	1	15	0	353,125	118	73	4	0	1	0	3	21	26
Dist. 4	16	2	1	2	11	0	87,970	123	108	4	0	0	0	4	32	34
East	32	14	1	0	17	0	151,446	89	63	14	1	1	0	12	28	20
Dist. 7-B	89	48	0	2	39	0	254,918	122	126	29	5	0	2	22	41	46
West	179	133	4	2	40	0	901,252	271	321	20	0	0	0	20	33	37
Dist. 9	96	40	0	5	36	15	305,205	169	199	19	2	0	1	16	30	41
Dist. 10	21	14	2	3	2	0	97,947	31	86	0	0	0	0	0	2	11
Utah	6	3	0	1	2	0	35,372	10	14	2	0	0	0	2	4	6
West Virginia	21	1	0	10	2	8	54,566	45	40	0	0	0	0	0	1	1
Wyoming	18	6	0	1	10	1	102,341	47	41	11	1	0	0	10	26	17
Misc. (Alaska)	9	0	0	0	9	0	19,074	12	6	8	0	0	0	8	11	4
Total U. S.	**1,118**	567	35	73	395	48	4,686,451	2,515	2,756	**238**	24	4	8	202	574	633
Previous week	908	385	63	69	383	8	4,597,828	.....	.....	226	18	6	7	195	.....	.....
Cum. 1960	2,515	1,140	123	197	970	85	11,394,181	.....	.....	574	48	10	16	500	.....	.....
Cum. 1959	2,756	1,304	68	165	1,148	71	11,877,705	.....	.....	633	62	11	22	538	.....	.....
Western Canada	35	24	0	4	7	0	193,825	35	33	7	1	0	1	5	7	32

PRODUCTION

ROTARY RIGS OPERATING IN UNITED STATES



CRUDE-OIL STOCKS



CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

	1-9-60	1-2-60	1-10-59
Pennsylvania	2,293	2,283	2,618
Other Appalachian	2,101	1,492	1,606
Illinois, Indiana, Michigan	9,787	10,108	10,501
Nebraska and North Dakota	2,826	3,245	1,924
Kansas	9,552	9,688	9,724
Oklahoma	16,853	16,916	16,928
Arkansas	2,084	2,240	1,989
Louisiana	17,516	17,942	17,318
North	3,304	3,297	3,096
South	14,212	14,645	14,222
Mississippi, Alabama, Florida	2,531	2,577	2,377
New Mexico	7,992	8,049	8,107
Texas	106,408	109,650	115,025
East Texas	8,051	8,056	8,729
West Texas	49,328	51,343	55,813
Texas Gulf	19,603	20,589	19,941
Other Texas	29,426	29,662	30,542
Wyoming	16,933	16,795	13,820
Other Rocky Mountain	9,686	9,627	9,049
California	29,021	28,792	33,853
Foreign	†13,327	13,496	15,416
Total	**248,910**	252,900	260,255

*Bureau of Mines. †Includes 4,045,000 bbl. in California.

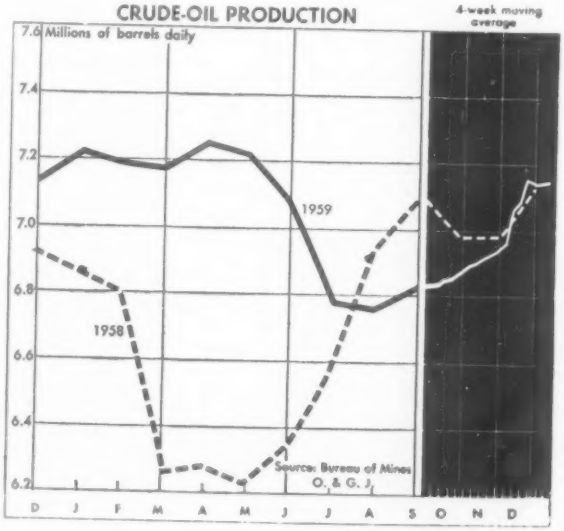
DAILY AVERAGE PRODUCTION FOR WEEK

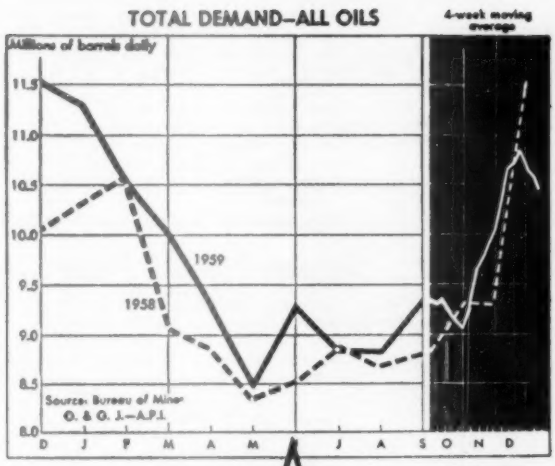
	January 16, 1960 — Crude oil	Lease condensate	Total	Jan. 9 total
Alabama	15,500	.....	15,500	16,000
Arkansas	81,500	150	81,650	83,150
California	834,500	.....	834,500	835,300
Colorado	129,500	.....	129,500	130,000
Eastern	42,000	.....	42,000	41,700
Florida	1,150	.....	1,150	1,150
Illinois	221,700	.....	221,700	215,000
Indiana	31,800	.....	31,800	31,400
Kansas	†328,110	.....	†328,110	†306,470
Kentucky	75,000	.....	75,000	75,000
Louisiana	946,900	123,000	1,069,900	1,070,100
North	106,900	5,500	112,400	112,600
South	840,000	117,500	957,500	957,500
Michigan	32,300	.....	32,300	32,300
Mississippi	141,850	4,870	146,720	146,720
Montana	82,000	.....	82,000	81,600
Nebraska	63,800	.....	63,800	64,000
Nevada	100	.....	100	100
New Mexico	292,600	6,800	299,400	299,400
North Dakota	58,700	.....	58,700	60,500
Oklahoma	†546,000	.....	†546,000	†550,000
Texas	2,584,000	81,000	2,665,000	2,665,000
Dist. 1	40,000	3,000	43,000	43,000
Dist. 2	112,000	8,900	120,900	120,900
Dist. 3	340,000	37,000	377,000	377,000
Dist. 4	179,000	9,800	187,800	187,800
Dist. 5	27,000	400	27,400	27,400
Dist. 6	111,000	9,400	120,400	120,400
East Texas field	142,000	.....	142,000	142,000
Dist. 7-B	135,000	180	135,180	135,180
Dist. 7-C	123,000	3,620	126,620	126,620
Dist. 8	1,074,000	5,200	1,079,200	1,079,200
Dist. 9	193,000	2,100	195,100	195,100
Dist. 10	108,000	1,400	109,400	109,400
Utah	109,900	.....	109,900	109,450
Wyoming	344,200	.....	344,200	344,600
Others	‡400	.....	‡400	‡450
Total U. S.	6,963,510	215,820	**7,179,330**	7,159,390
Change from prev. week, up			**19,940**	
Canada	†620,400	.....	†620,400	†475,400

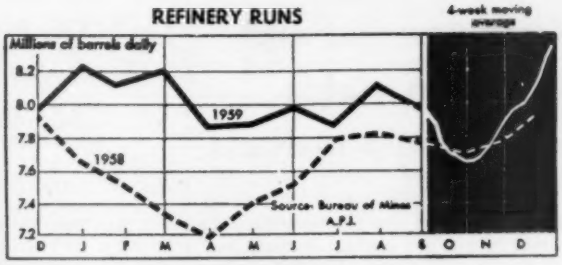
Total U. S. prod., January 1-January 16 ..... 114,569,940 bbl.
Same period last year (crude plus cond.) *115,058,320

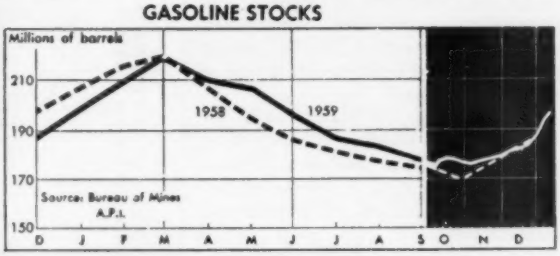
*Includes 3,642,020 bbl. condensate. †Week ended previous Monday. ‡Arizona, South Dakota, and Washington.

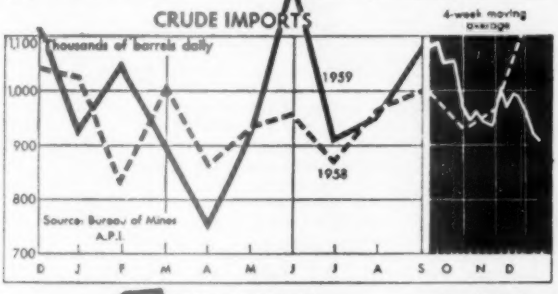
CRUDE-OIL PRODUCTION

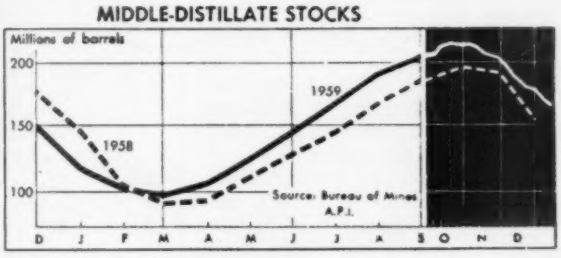


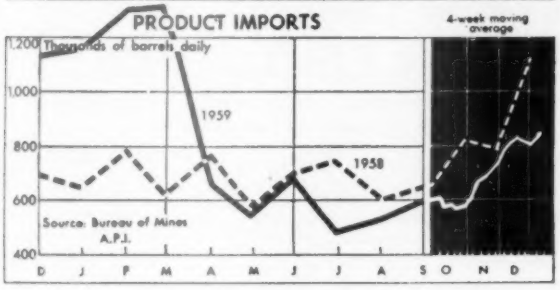


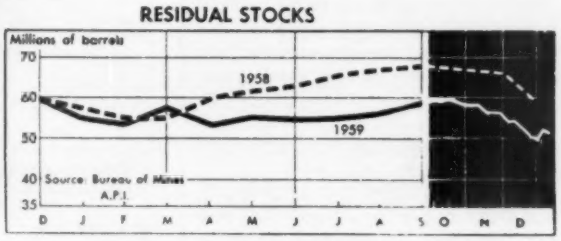












API REFINERY REPORT—JANUARY 15, 1960

(Thousands of Barrels)

District—	Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.	Stocks‡—Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, January 1959—Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.
East Coast	1,135	500.9	56.0	311.1	153.7	41,600	11,034	52,402	12,683	1,195	550.9	45.4	416.3	225.8
Appalachian:														
District 1	108	40.4	3.8	22.4	14.3	5,899	702	3,699	297	97	39.7	6.5	21.5	11.9
District 2	108	46.9	8.3	17.9	15.3	3,105	441	1,544	414	114	57.4	7.3	20.0	18.6
Ind., Ill., Ky.	1,598	811.7	84.7	378.6	226.6	35,214	5,625	23,405	5,405	1,512	738.9	80.0	359.6	223.2
Minn., Wis., Dak.	123	60.0	5.0	30.9	17.3	7,494	1,022	6,394	685	108	52.4	6.4	28.4	14.6
Okla., Kans., Mo.	766	414.9	20.4	206.7	25.7	18,800	1,251	10,802	1,096	770	416.0	22.7	210.0	40.8
Inland Texas	300	210.7	10.6	50.1	20.6	7,586	462	1,568	2,401	278	183.9	8.8	48.3	21.7
Texas Gulf Coast	1,921	977.6	117.1	503.9	169.0	25,165	2,591	15,485	5,591	1,961	979.2	142.9	564.9	182.2
La. Gulf Coast	683	364.1	69.6	178.1	37.4	11,145	1,981	5,968	910	699	343.6	81.2	184.5	50.4
N. La. and Ark.	88	45.4	5.4	28.3	6.1	4,981	790	2,361	207	92	45.3	5.8	19.1	5.8
Rocky Mountain:														
New Mexico	27	15.4	0.6	4.9	2.7	892	61	176	90	24	11.3	0.6	4.6	2.4
Other R'cky Mt.	287	142.3	3.3	68.1	33.0	6,222	194	2,449	1,108	287	136.4	4.2	62.8	37.5
West Coast	1,158	524.6	4.3	158.1	296.4	28,411	429	12,286	20,376	1,093	502.5	6.9	193.0	281.9
Jan. 15, 1960	8,302	4,154.9	389.1	1,959.1	1,018.1	196,514	26,583	138,539	51,263	8,230	4,057.5	418.7	2,133.0	1,116.8
Jan. 8, 1960	8,396	4,175.7	390.1	1,974.4	1,034.3	193,948	§26,852	§144,134	§52,358	....	.....	.....	.....	.....
Jan. 16, 1958	8,129	4,069.7	462.0	2,107.3	1,089.9	190,748	23,235	109,095	59,368	....	.....	.....	.....	.....

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipelines. §Revised.

Cold weather and a shift in yields would help markets

TOO MANY PEOPLE are expecting too much from the weather man. If temperatures are low for the last half of January and most of February in the north-central and northeastern areas of the country, distillate stocks may be in good position at the end of the first quarter.

That's a big "if." But wait. Six weeks of cold weather still is not an absolute guarantee of firm product prices over the next 2 months. It will take a little restraint on the part of refiners.

Distillate stocks amounted to 138,539,000 bbl. on January 15. This could be pulled down to about 80,000,000 bbl. by the end of February and still leave a cushion to cover abnormal demands in March. This means about 1,300,000 bbl. daily can be supplied from inventories.

The all-time record demand for distillate was the 3,181,000 bbl. daily reported for December 1958. Refiners would be glad to settle for the rate over the coming 6 weeks.

But if 1,300,000 bbl. daily of this hoped-for-but-not-expected demand can be supplied out of inventories, required current production would be 1,881,000 bbl. daily. Compare this with average production of 1,966,000 bbl. daily for early January.

The figures show that refiners will not need to make distillate at the rate reported for the first 2 weeks of the year. But even if the high rate were required, the job could be accomplished by increasing percentage yield of distillate and lowering refinery runs. This method would help prevent a market-depressing buildup of gasoline stocks before March.

Gasoline stocks have been too high for the past 4 years. It would be a welcome change this year for the refiner to start the motoring season with reasonable gasoline inventories.

Current prices . . . Distillate prices are off about 0.25 cent a gallon in the Group 3 area, but suppliers are hoping for a demand increase that will add strength to the market.

Interrefinery purchases of regular gasoline can be made at 9.5 cents on the Group 3 market. This may be under actual cost for some refiners. Oklahoma crude, 36°-36.9° gravity, costs the refiner over 7.0 cents a gallon plus transportation costs.

Crude-Oil Prices

GRAVITY SCHEDULE

	Signal Hill, Calif.	Oklahoma	Gulf Coast Tex.*	West Tex.† N.M.	Wyo. (sour)
14-14.9	$1.76	....	....	....	....
15-15.9	1.84	....	....	....	$1.81
16-16.9	1.92	....	....	....	1.86
17-17.9	2.00	....	....	....	1.91
18-18.9	2.08	....	....	....	1.96
19-19.9	2.16	....	....	....	2.01
20-20.9	2.24	$2.49	....	$2.35	2.06
21-21.9	2.32	2.52	....	2.38	2.11
22-22.9	2.39	2.55	....	2.41	2.16
23-23.9	2.46	2.58	$3.44	2.44	2.21
24-24.9	2.53	2.61	3.46	2.47	2.26
25-25.9	2.60	2.64	3.48	2.50	2.31
26-26.9	2.67	2.67	3.50	2.53	2.36
27-27.9	2.74	2.70	3.52	2.56	2.49
28-28.9	2.81	2.73	3.54	2.59	2.54
29-29.9	2.87	2.76	3.56	2.62	2.59
30-30.9	2.93	2.79	....	2.65	2.63
31-31.9	3.00	2.82	....	2.68	2.67
32-32.9	3.06	2.85	....	2.71	2.71
33-33.9	3.12	2.88	....	2.74	2.75
34-34.9	3.17	2.91	....	2.77	2.79
35-35.9	3.22	2.94	....	2.80	2.83
36-36.9	3.27	2.97	....	2.83	2.87
37-37.9	3.31	2.99	....	2.86	2.89
38-38.9	....	3.01	....	2.89	2.91
39-39.9	....	3.03	....	2.92	2.93
40-40.9	....	3.05	....	2.95	2.95

*Low cold test crude. †Sour.

Effective dates of broad changes: California, 9-11-59; East of California, January 3-10, 1957; Pennsylvania Grade 1-11-60.

FLAT PRICES

Louisiana:	
Sweet Lake	$3.00
Texas:	
East Texas	3.05-3.25
Conroe	3.23-3.53
Van	3.08
Pennsylvania Grade:	
Bradford	4.55
Middle District	4.37
Southwest Pennsylvania	4.10
West Virginia	3.92
Buckeye Grade	3.97
Illinois Basin	**3.00**

FOREIGN

Canada:	
Leduc-Woodbend	2.53
Redwater (Alta.)	2.42
Smiley (Sask.)	2.18
Pembina	2.38
Venezuela:	
Cumarebo, 48°-49.9°, Tucupido	3.34
San Joaquin, 41°-41.9°, Puerto La Cruz	3.08-3.10
Oficina, 35°-35.9°, Puerto La Cruz	2.80
Tia Juana medium, 26°-26.9°, Amuay*	2.30
Quiriquire, 16.0°-16.4°, Caripito	2.10
Lagunillas heavy, flat, Las Piedras*	2.10
Bachaquero, flat, 15°-16°, Las Piedras*	1.88

Prices for all crudes of 24° or lighter vary 2 cents per degree change, up or down. All crudes heavier than 24° vary 2.5 cents per half-degree gravity change.

*Also available at La Salina at 3 cents per barrel less.

Middle East, Persian Gulf (cargoes f.o.b. lifting port):	
Arabian, about 34°, Ras Tanura	$1.89
Iranian, 34.0°-34.9°, Bandar Masur	1.80
Iranian, 34.0°-34.9°, Abadan	1.81
Iraq, 36.0°-36.9°, Fao	1.82
Kuwait, 31.0°-31.9°, Mina-al-Ahmadi	1.67
Qatar, about 41°, Um Said	2.05
Middle East, E. Mediterranean:	
Arabian, about 35°, Sidon	2.29
Iraq, about 35°, Tripoli, Banias	2.29
Far East (cargoes, f.o.b. Lutong, Sarawak):	
Seria Light, 37°	2.57

Refined-Product Prices

Following quotations are for refinery products in cents per gallon moving in interstate shipments on Wednesday each week unless otherwise noted. Crude-oil prices are per barrel at the wells unless otherwise listed.

GASOLINE*

Mid-Continent (Group 3):	
Regular (91 octane)	9.75-10.00
Premium (99 octane)	12.25-12.75
Natural gasoline (26-70)	4.5
Breckenridge	4.0
Gulf Coast (cargoes for coastwise or export movements):	
Regular (90 octane)	10.25-10.50
Regular (92 octane)	10.50-10.75
Premium (98 octane)	11.75-12.00
California (rack) Los Angeles):	
Regular (88 octane)	11.65-12.15
Premium (94 octane)	12.65-13.15
Premium (100 octane)	14.00-14.65
Caribbean area (cargoes):	
Regular (87 octane)	10.125
Premium (97 octane)	11.75

*Quotations are for octanes shown. Prices usually vary with octane ratings within the regular, premium, and aviation grades.

KEROSINE AND DISTILLATE

Mid-Continent (Group 3):	
★ Kerosine 42-44	10.25-10.50
★ Diesel oil (58 d.i. and above)	10.00
★ Distillate No. 1	10.00-10.25
★ Distillate No. 2	9.25
Gulf Coast (cargoes):	
Kerosine 41-43	9.50
Distillate No. 2	8.625
New York Harbor (barges):	
Kerosine 41-43	11.10
Distillate No. 2	10.10
Diesel fuel, 48-52 d.i.	10.40
Caribbean area (cargoes):	
Distillate No. 2	8.375-8.675

RESIDUAL FUEL (BBL.)

Mid-Continent (Group 3):	
Residual fuel (max 1% S)	$1.80-1.90
Gulf Coast (cargoes):	
Bunker C fuel	$2.00
New York Harbor (barges):	
Bunker C fuel	$2.37
Caribbean (cargoes):	
Bunker C	$2.00
California (rack):	
Bunker C fuel, Los Angeles	$2.15

Tanker Rates (Long Ton)

(Latest reported spot fixtures)

★ Gulf-USNH, dirty (ATRS—35%)	$1.85
★ Carib.-USNH, dirty (ATRS—45%)	1.51
★ Carib.-UK, dirty (Scale—47.5%) (17s. 1d.)	2.39
★ PG-UK, dirty (Scale—45%) (32s. 7d.)	4.56

★ Denotes change from previous week.

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PIPE CHAIN Tongs—Armstrong 15 and 35 for 2" to 12" pipe. Army surplus, unused in excellent condition. Price $29.50 each. Layne Northern Company, Inc. Mishawaka, Indiana.

USED IDECO Full View Mast—133' high, with FM4-C86 Six Sheave Crown Block, Crown Safety Platform, Raising Mechanism, Twin Type Racking Platform, Dead-line Anchor and Catline Sheave, mounted on 8' high Substructure with Steel Flooring. New-like condition: Located Odessa. Lucey Products Corporation . . . 624 South Cheyenne Avenue, Phone LUther 4-4711, Tulsa, Oklahoma.

36" x 70' Overall LEBLOND COMBINATION OILFIELD TURNING THREADING BORING & TREPANNING LATHE. (Can be used as a 25' CC Lathe). NEW 1941. Used by gov. 1 yr. 16" hole in spdle. Boring bar 25'. Terms. 90 day return guarantee.
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1 BUCYRUS—ERIE 36L Spudder, late model. Rig complete with tools and equipment. Cassel Drilling Co., Inc., Dumas, Texas. Phone WE-5-5019 or WE 5-4369.

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42	Admiralty	170-2060
10	Chrome	212-1580
4	Brass	460-840
1	Chr-Moly	355

TOWERS

Quan.	Size	Trays
1	7' x 40'2"	14
1	9' x 40'2"	10
1	10' x 40'2"	3
1	5'6" x 38'3"	14
1	6'6" x 38'6"	6
1	12' x 73½"	31
1	5' x 31'¼"	8
1	3' x 42"	12

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BUCYRUS-ERIE 28-1 drilling machine, 6 years old. Casing strut, 6 MZA Waukesha engine, will stand rigid inspection. Priced right. Degen Pipe & Supply Co., Tulsa, Oklahoma.

18" AND 20" good used pipe. Very attractive prices. Contact: The Tri-State Pipe Co., Bellaire, Ohio. Telephone OR 6-1452.

WELL DRILLS—CORE DRILLS. Everything for well and core drilling in both new and used equipment at money saving prices. Fishing tools rented. Send for bulletins. Pressey & Son, Pueblo, Colo.

FOR SALE OR LEASE: Three (3) large perforating trucks complete with 16,000' of 7/16" single conductor line. These units are ready for the field. Box L-614, The Oil and Gas Journal, Tulsa, Oklahoma.

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1 NATIONAL T-20 rig complete: WAKBU, torque converter, 87' Moore mast, 7' substructure, 7¼" x 14" FXQ skidmounted with LRO, 4900' good 4½" drillpipe, 12 collars 5¾". 1 Unit 15 rig complete: 2 Climax V-80's, hydromatic, 7¾" x 16" FOFXO compounded, 127' Moore mast, 9' substructure, 7,000' practically new 4½" drillpipe, 18 collars 5¾". Rigs include all extras needed by major companies and are currently working in West Central Texas. Box L-668, The Oil and Gas Journal, Tulsa, Oklahoma.

USED BREWSTER N-4 Torque Converter Rig Complete powered by Waukesha 6WAK Engine, with 93' Moore Mast and 6'-4" high Substructure, Gardner-Denver 7¼" x 12" Pump powered by LeRoi 12-Cylinder Engine, Brewster R-4-30 Traveling Block with BJ 460 Hook, Brewster 4-S Swivel, Brewster OB-18 Rotary, Regan Blowout Preventer, Vibrating Shale Shaker, Complete Accessories, Drill Collars and optional 4" O.D. or 4½" O.D. Drill Pipe. Excellent condition. Priced right. Located Oklahoma City. Lucey Products Corporation . . . 624 South Cheyenne Avenue, Phone LUther 4-4711, Tulsa, Oklahoma.

Approx. 8,000 Ft.—1¼" EUE Well Tubing, T&C, 3½" long couplings, 22' R/L. A-1 used condition. Price—30 cents foot.

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8 Riveted Steel Shells 36" diameter x 40' long, ½" thick plate, 200 pound WP. Approx. weight 10,000 pounds each. Excellent condition. Price—$350.00 each, "As is".

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USED WAUKESHA 6LRZU Engine on Extended H-Beam Skid with Fawick Air Clutch and V-Belt Sheave mounted between Roller Bearing Pillow Blocks. Ideal for independent pump drive. Located Oklahoma City. Lucey Products Corporation . . . 624 South Cheyenne Avenue, Phone LUther 4-4711, Tulsa, Oklahoma.

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HELP WANTED

IMPORTANT POSITION offered in France for reservoir engineer with minimum six years experience. Knowledge of French preferable. Box L-653, The Oil and Gas Journal, Tulsa, Oklahoma.

GROWING ARKANSAS Refinery needs graduate Chemist or Chemical Engineer. Five to ten years Lube or Asphalt experience preferred. Submit experience, degree, and transcript of grades. Box L-657, The Oil and Gas Journal, Tulsa, Oklahoma.

NEW OIL JOB Directory, foreign and domestic, showing where to apply for jobs 500 selected producing, refining, butane and pipeline companies. Nationwide, $6.00 cash OIML Co., Box 2603, Tulsa, Oklahoma.

WANTED: Petroleum Engineer with oil field and reservoir engineering experience. Starting salary will be $600 per month. Address correspondence to Utah Oil & Gas Conservation Commission, 310 Newhouse Building, Salt Lake City 11, Utah, giving qualifications. All applications will be held confidential.

CHEMICAL ENGINEER

Chemical Engineer Degree with at least 3 years experience in gas products plant process design, including estimating costs, making computations, preparation of reports and specifications for products, materials, and equipment.

Send complete resume of experience and education to Personnel Manager, P. O. Box 521, Tulsa, Oklahoma.

OPENING FOR DISTRICT GEOLOGIST

in Midcontinent area of Oklahoma and Kansas. The experience and ability to plan and execute an active exploration program for a substantial independent company is required for this opening. All replies will be considered confidential. Please send personal summary complete with a detailed history of experience to:

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P. S. Time is important so act today!

WANTED—Instrument mechanic for refinery in New Orleans area. Wages & benefits excellent. Box L-663, The Oil and Gas Journal, Tulsa, Oklahoma.

PROPOSED NEW Oil Company is seeking an exploration manager who can demonstrate recent responsibility for successful Gulf Coast wildcat exploration. Proven ability essential. Must assume heavy responsibilities. Substantial interest in results plus salary and stock. Will treat all answers confidentially but please do not respond unless convinced your exploration methods and philosophy profitable. Box L-675, The Oil and Gas Journal, 802 American Investors Bldg., Houston, Texas.

STRATIGRAPHER—With one year minimum sample and well site experience in carbonates, for opening in Southern Rockies. Submit complete resume with professional references and salary requirements. Box L-671, The Oil and Gas Journal, Tulsa Oklahoma.

WANTED BY Refiner, man combining substantial experience, petrochemical manufacture and sales to spearhead entry into petrochemical field. Good opportunity for right man. Gulf Coast Area. Box L-665, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR UNION CARBIDE Corporation Production engineer-geologist with 3-10 years field experience plus degree in petroleum engineering or geology; to study price and availability trends, evaluate reserves, develop sources and transportation, negotiate prices and arrange contracts for NATURAL GAS supplies for UCC plants throughout USA. To locate in General Purchasing Department in New York City. Send resume to E. J. Corry, 30 East 42 Street, New York 17, N. Y.

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Needed by a top, integrated independent. We are interested in a young man with both field experience and a reservoir engineering background. Send resume of experience and education to:

BOX L-673,
THE OIL AND GAS JOURNAL,
TULSA, OKLAHOMA.

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Refining

Opportunity in Technical Service Department for Chemical Engineer with approximately 4 years experience in petroleum refining or petrochemical processing. Assignments include liaison between Technical Service and Process departments, process design and economic evaluations.

Refinery located in Northern Minnesota, liberal benefits; good housing available. Subsidiary of major oil company. Send resume to:

Industrial Relations Manager
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Wrenshall, Minnesota

SITUATIONS WANTED

SALESMAN—41, Marketing major, 10 years experience, knowledge of petro-chemicals, oil production equipment. Excellent references. Box L-647, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATION WANTED

GEOLOGIST: 32, 10 years on and offshore Gulf Coast, Texas, Louisiana and Ark-La-Tex experience including sub-surface, seismic, stratigraphic, evaluation, checking and finding deals. Wide range of contacts. Box L-661, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER—34, 11 years production experience. O. U. graduate. Box L-679, The Oil and Gas Journal, Tulsa, Oklahoma.

RESEARCH PETROLEUM Geologist 32, Master's, extensive experience, domestic, foreign, desire responsible position. Box L-677, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, 33, married, 10 years sales and management experience with oilwell servicing company, seeks sales or management work. Financial participation considered in small agressive company. Box 31 R 499, The Oil and Gas Journal, 4041 Marlton Ave., Los Angeles 8, Calif.

GEOLOGIST 17 years experience, foreign and domestic, subsurface, well site geology, scout and engineer. Speak Spanish. Available May. Would consider situation other than geology relation to oil business. Box L-676, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST—Seven years domestic and foreign experience in surface and subsurface geology, age 31, married, desires foreign employment. Box L-674, The Oil and Gas Journal, Tulsa, Oklahoma.

RESERVOIR ENGINEER: desires position with independent oil or gas company. Presently employed by major oil company with five years experience. Desire location in Houston, Dallas, or New Orleans. Resume on request. Box L-634, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGICAL ENGINEER—39, presently employed with major company. Eleven years experience in field geology, subsurface, seismic, and well site in Venezuela and United States. Specialized training in economic evaluations of drilling prospects. Some experience in reservoir engineering. Desires domestic employment, but will consider foreign. Box L-672, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, 41, B.S. Texas A&M., 23 years experience drilling, production, appraisals, evaluations, unitization, secondary recovery, engineering, management positions, presently employed, excellent references, desires management or senior engineering position with chance for advancement. Box L-676, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST—Eleven years with Major Ark., La., Tex., & Miss. desires employment with smaller, more active company. Box L-660, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST—33, M.S., 8 years foreign and domestic experience. Desires foreign work. Resume on request. Immediate availability. Box L-667, The Oil and Gas Journal, Tulsa, Oklahoma.

THOROUGHLY EXPERIENCED contracts, leases, titles, damages, right of way. Licensed attorney Texas, Oklahoma. Will relocate with producing and/or pipeline organization. Available February First. Box L-662, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

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DRILLING ENGINEER—Graduate engineer, 3½ years equipment engineer with large drilling company, 3 years design engineer on all types of drilling contractor. Box L-681, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST, age 36, 10 years experience, primarily Mid-Continent Area, capable of evaluating areas and generating prospects, best references. Complete resume upon request. Louis McPherron, 402 Masonic Building, Shawnee, Oklahoma.

GEOLOGIST—14 years Exploration and Development Geology, Land, Drilling, Production and Appraisal Experience. Can successfully supervise a one well or five hundred well program. Box L-654, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS OPPORTUNITIES

FOR SALE—Six patent applications pending on underground atomic or hydrogen explosions, for generating electric power, increasing the recovery of hydrocarbons, and also creating old and/or new synthetic elements, isotopes, abrasives, gems, and the like. Frank Summers, Milton, Iowa.

FINANCIAL Contacts, Underwriters, Private Brokers reached. No shopping. Confidential. Send details to Consultant—817—51st Street, Brooklyn, N. Y.

FOR SALE—Texas corporation (Oil exploration and drilling) with medium to high six figure tax loss, oil production and 2 excellent rotary rigs. Stockholders wish to sell, though might consider merger. Ideal vehicle for small group with production who wish to expand. Box L-669, The Oil and Gas Journal, Tulsa, Oklahoma.

NEW PRODUCTS WANTED—Well-established, responsible company with complete facilities for developing, manufacturing and marketing oil field equipment is seeking new or improved products, preferably patented or patentable to add to its presently well-known line. Royalty basis or outright purchase. Initial submission should identify product and general use without revealing engineering and confidential detail. Submissions will be handled promptly and confidentially. Box K-994, The Oil and Gas Journal, Tulsa, Oklahoma.

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LEASE AND DRILLING BLOCKS

WATERFLOOD PROSPECT—Eastern Kansas. 12 BOPD Settled Production. Core Analyses and Engineering Report. Box L-658, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL AND GAS MINERAL LEASES available in Dell City area of Hudspeth County, Texas. U. S. Geological Survey Map shows anticlinal axis nearby favorable for oil-gas structure. Am fee landowner of over 2,000 acres. Write quickly to: Jefferson G. Smith, 715 Littlefield Building, Austin 15, Texas.

WATER FLOOD Franklin County, Kansas. 640 acres, good engineering and best equipment, modern in every respect. Wonderful potential, good reason for selling. No brokers. Unless you are financially responsible do not reply. Box L-326, The Oil and Gas Journal, Tulsa, Oklahoma.

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THE OIL AND GAS JOURNAL
TULSA, OKLAHOMA

LEASE AND DRILLING BLOCKS

ARIZONA—Government Oil Leases, Low as $1.00 Acre. Ethical speculation-leasing service. Edward Colson, 1716 West Devonshire, Phoenix, Arizona.

FOR LEASE: 320 acres for oil and gas near Dunkirk, Montana. Mrs. Jennie Creswell, Boyden, Iowa.

ROYALTY UNDER actively developing waterflood—Okmulgee County, Oklahoma. Engineering report and core analyses. Box L-649, The Oil and Gas Journal, Tulsa, Oklahoma.

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WILL BUY
SETTLED PRODUCTION
Full Information On Reply
No Triflers
BOX L-625
THE OIL AND GAS JOURNAL
TULSA, OKLAHOMA

LEGAL

SALE OF OIL AND GAS MINING LEASES TRIBAL AND ALLOTTED INDIAN LANDS, Department of the Interior Bureau of Indian Affairs, Uintah and Ouray Agency Fort Duchesne, Utah, SEALED BIDS will be received until 2:00 P.M. Mountain Standard Time, February 9, 1960, and opened at that time in the Office of the Uintah and Ouray Indian Agency, Fort Duchesne, Utah, for the leasing of 640 acres of Tribal Indian lands, and 987.94 acres of allotted Indian lands, located in Townships 10 and 11 South, Range 20 East, Salt Lake Meridian, Uintah County, Utah, for oil and gas mining purposes. The details of the lease offering and how and where to file bids may be obtained by addressing the inquiry to the Superintendent of the Uintah and Ouray Indian Agency, at Fort Duchesne, Utah.

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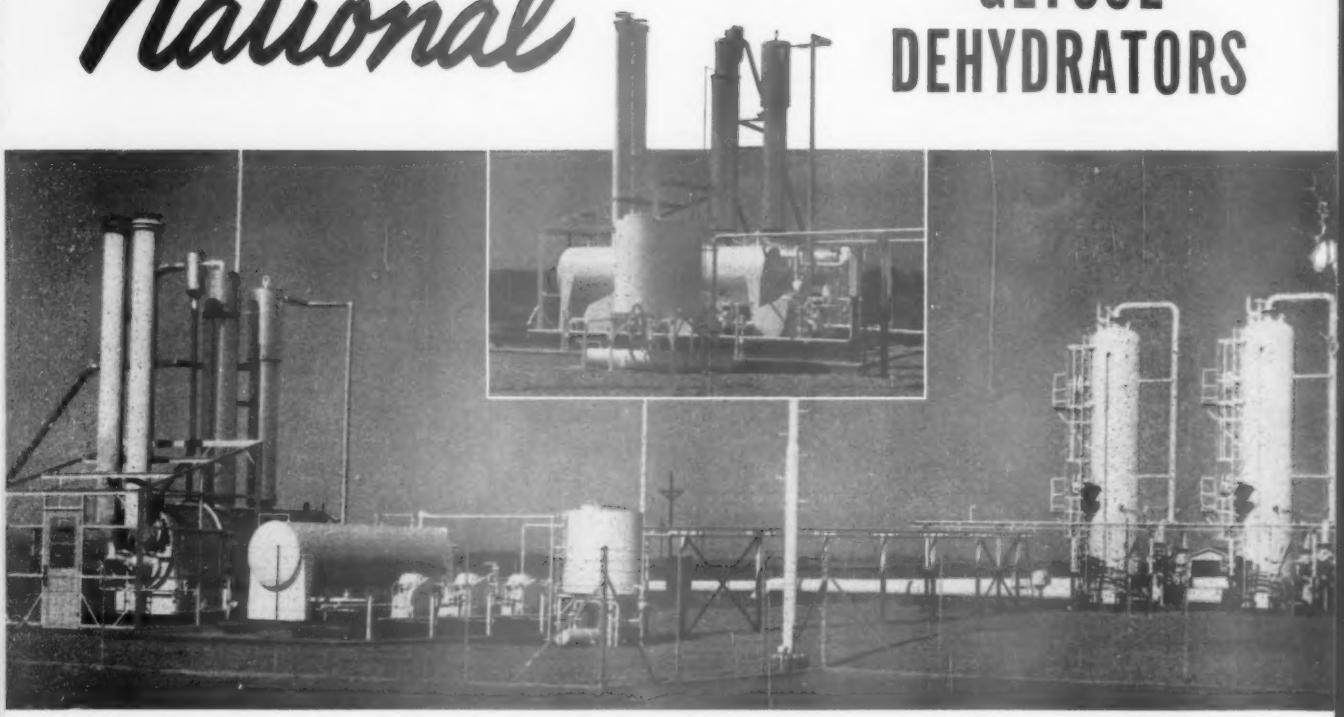

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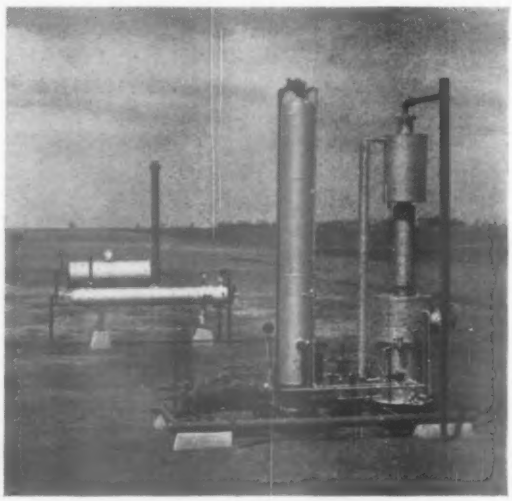

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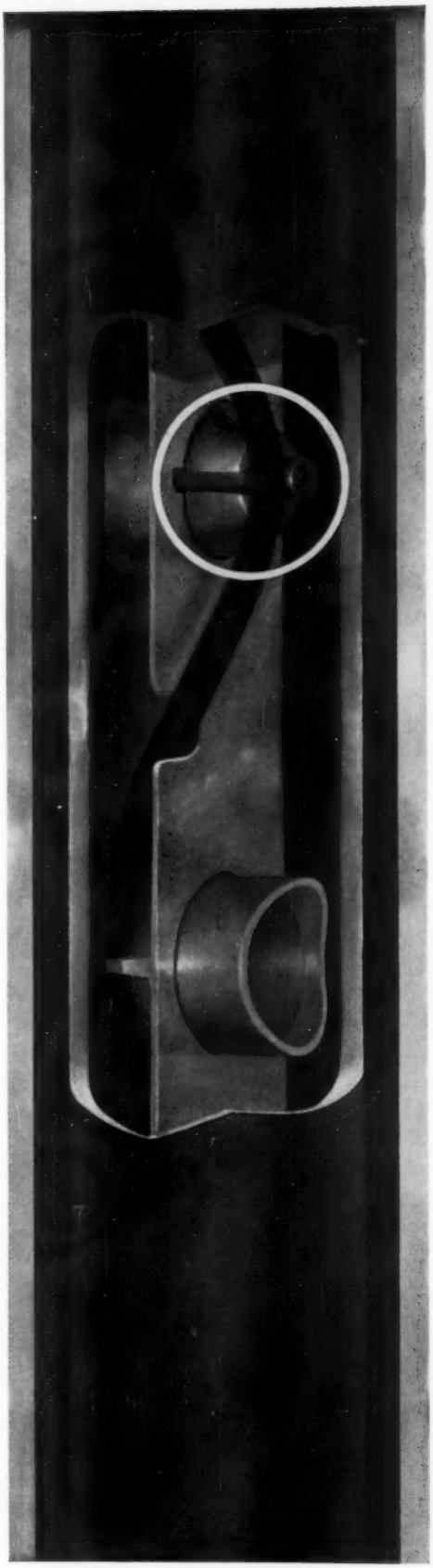

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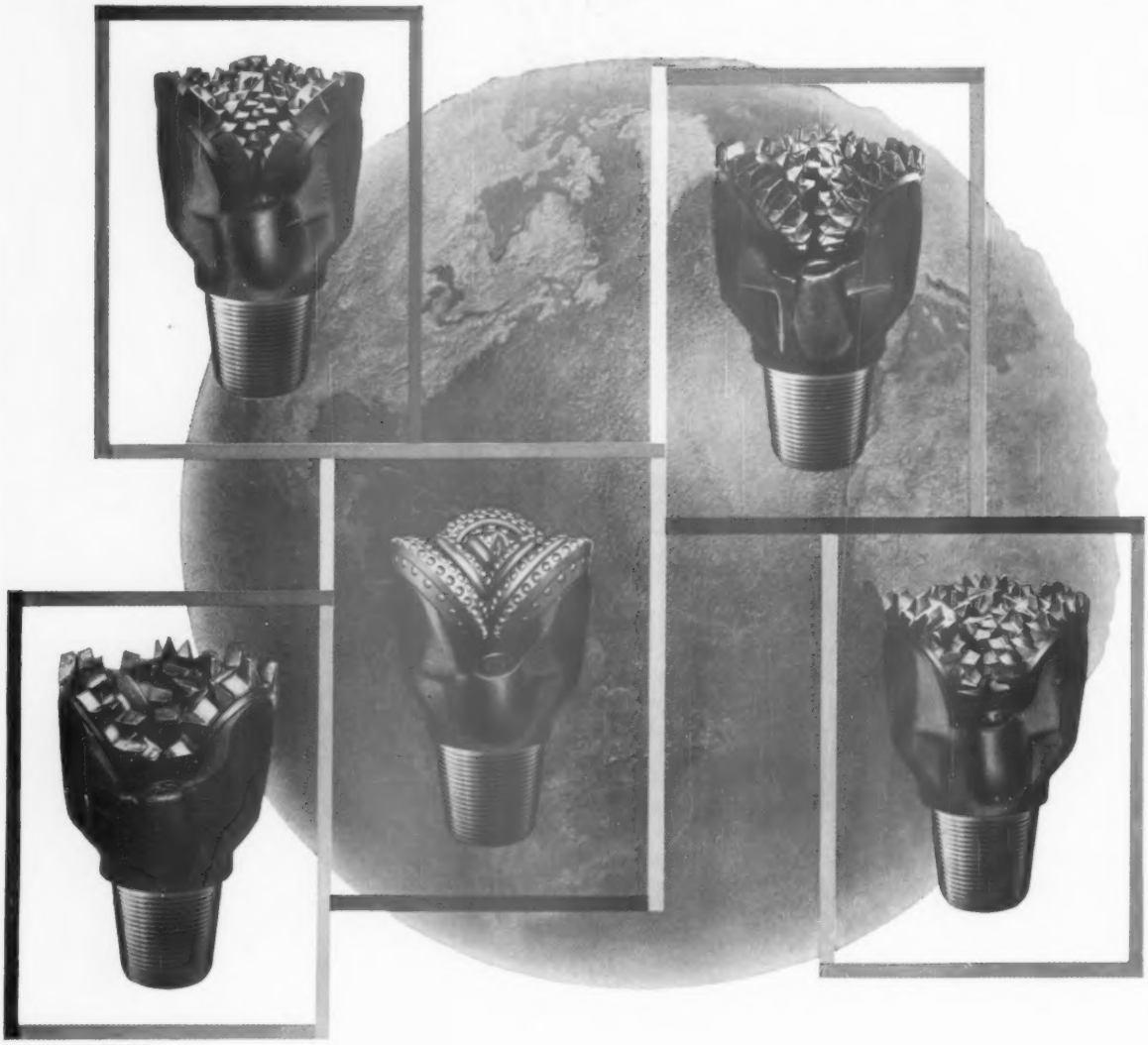

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